The Gazette Talks To The Authors Of *Hitchhiker's Guide* And *Mindwheel*

COMPUTE!'s GAZETTE

$2.95
June 1985
Issue 24, Vol. 3, No. 6
02220 $3.75 Canada

FOR **COMMODORE** PERSONAL COMPUTER USERS

Inside The 128

A Hands-On Look
At Commodore's Newest Computer

Screen-40

40 columns for your VIC. With full screen editing and easy graphics.

Dynamic SID Editor

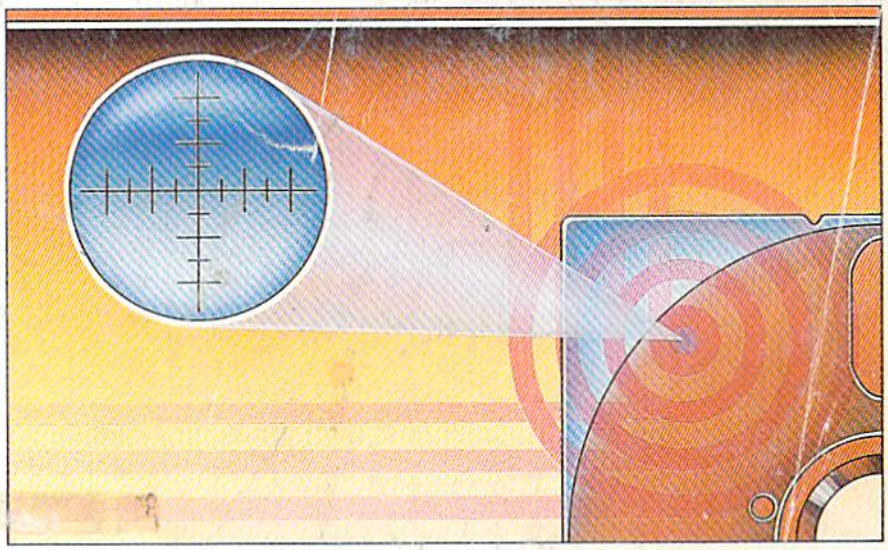
Instantly see and hear what your 64's sound chip can do.

Also In This Issue:

Interview With Paul Goheen, Commodore's Director Of Software

A Guide To Commodore User Groups, Part 2

Plus Reviews, New Products, And More



The Freeze Factory

Four robots run amok in this action-strategy game for the VIC and 64.

Relative Files: Speed And Economy

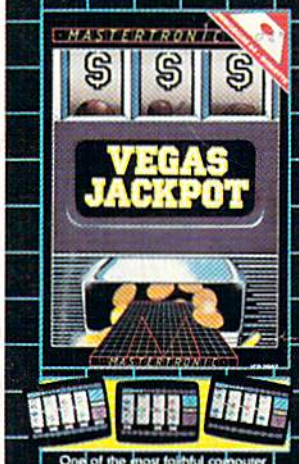
A step-by-step tutorial that takes the mystery out of using relative files. For 64, VIC, Plus/4, and 16 owners.

0 71486 02220 06

MASTERTR

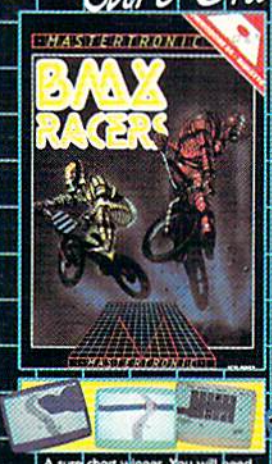
ARCADE-STRATEGY-ACTION

Sure Chart Winners



One of the most faithful computer simulations ever produced of a fruit machine. It incorporates the hold, nudge, gamble and shuffle features found in the real thing.

A satellite retrieval game that includes 16 levels of "low pressure" death awaiting the unskilled astronaut.



A sure chart winner. You will need skill and fast reflexes to beat this one! You can ride on 5 different courses, each course ranges from 8 to 25 different scrolling screens.

Opened to Five Star Reviews in Europe recently this is surely one of the most challenging and unusual games available for the C64. Written by 'Commodore Programmers of the Year' Richard and David Darling. The game has five different spectacular screens with hidden twists — if you get this far you have to retrace your steps through another five of increasing difficulty.

Another unusual arcade – strategy game in which the players strive by weird and wonderful techniques to achieve a state of miniaturisation and hence enter Zycos brain and the game continues in another dimension.

An imaginative three screen multi level arcade adventure that uses very high resolution graphics and will test the abilities of the most experienced games players.

A scrolling multi screen game that takes Commodore graphics to a 'new' state of the art level previously seen only in a handful of other games. Playability is a keyword on this 'five star game'!

A one or two player game with split screen scrolling graphics that realistically simulates off road riding on eight different and challenging courses.

Multi screen arcade action with real twists needing a steady hand and a bold strategic game plan. It will keep your interest alive for hours.

Neat variation on a city bomber theme using excellent scrolling graphic routines that is extremely addictive.

MAGRA and GAMES CREATOR $19.99

$9.99

SPECTACULAR

HIGH QUALITY SOFTWARE

ONIC!

BRINGS YOU BRAND NEW UNBELIEVABLE COMMODORE 64 DISKS

ADVENTURE

Expand the Horizons of your Mind

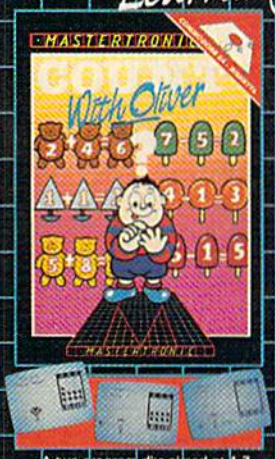
An absorbing multi level, multi screen game that uses excellent scrolling screen graphics. It requires not only fast reactions but good memory recall.

Britains zany Monty Python team immortalised in a classic adventure game that is rude irreverent, and often very funny. The challenge could drive you banana's!

An amazing two program adventure using over 100K of memory that will challenge the most experienced adventure games players. Myriad locations graphically illustrated with thousands of alternative moves will probe the limits of your mind.

EDUCATIONAL

Learning is Fun



A two program disc aimed at 4-7 year old children that introduces the basics of counting, and simple addition and subtraction. At the same time the child is both amused and entertained by the fun aspects of the programs.

These two testing programs were written by college principal Gordon Askew and help to sharpen observational skills and visual memory. Each of the two programs contains three games and are aimed at 4-7 year olds and then from 7 years upwards. The screen graphics and entertainment value guarantee a childs interest and pleasure.

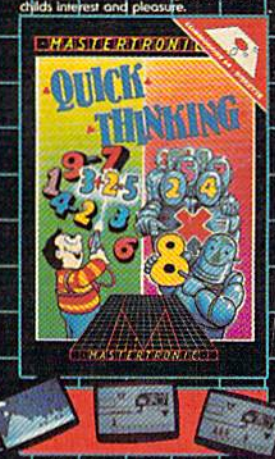
Star Wars' 1983 style with a very fast moving five screen arcade action game with multi skill levels.

A six programme adventure with 180K of memory

A six program adventure in the Third Continent magical fantasy series using over 180K memory could absorb and expand your imagination for months.

Truly 'State of Art' programming in this latest Third Continent adventure. Launched to rave reviews in England. This is a 120K adventure in three programs that comes with a beautifully illustrated 156 page descriptive 'book of shadows' set not to be missed by serious games player.

A very user friendly music creation program which allows The Budding Musician to write "On Screen" using either keyboard or joystick, extensive musical scores with up to 30 notes per page and seven pages in total. After composing your music you then choose to play it back complete on either trumpet, piano, guitar, recorder or trombone or delete and amend.



Double pleasure from two programs that will introduce early learners into the intricacies of multiplication. Age levels range from 6-12 years on game one and from eight upwards on the second game. Several levels of difficulty and choices of speed will sustain interest on the programs for a long time.

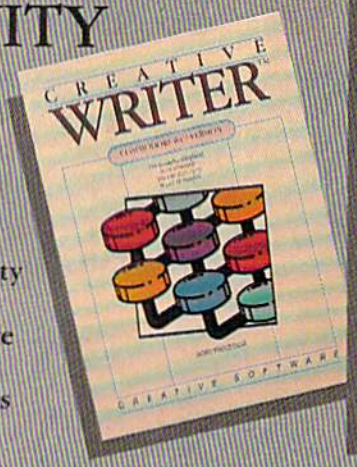
RedHot PRICES!

Look for MASTERTRONIC programs at your local computer dealer or mass merchant. For more information write or call (212) 213-0166
Mastercard and Visa accepted.

$9.99

MASTERTRONIC INTERNATIONAL INC.
407 Park Avenue South, Suite 16 A New York, N.Y. 10016

CREATIVE SOFTWARE INVITES YOU TO COMPARE PRODUCTIVITY PROGRAMS.

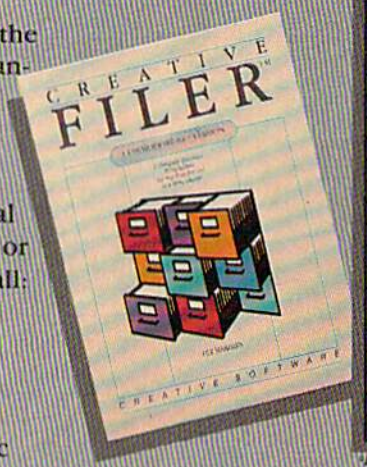


GOOD NEWS FOR COMMODORE 64 OWNERS. Now you can own the finest productivity software on the market for a truly affordable price. Creative Writer, Filer and Calc–three powerful, integrated programs designed for home and office use.

COMPARE. Others who have purchased our product agree that Creative Software offers the finest word processor, file manager and spreadsheet on the market for your software dollar.

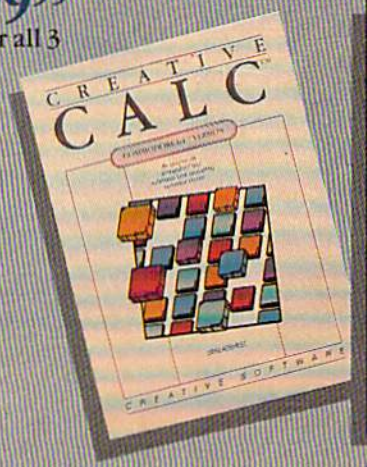
AVAILABLE NOW at your local retailer. If product is sold out or if you want a FREE catalog, call:

800-331-7990 or
800-448-1001 (Calif. only)



SAVE A BUNDLE.
Creative Writer, Filer and Calc in bundle box of 3.

JUST $99.95* for all 3



* Commodore 64 Suggested Retail Price

Commodore 64 Comparisons

Word Processors

Features/Benefits	Creative Writer	PFS: Write	Bank St. Writer	Home Word	Cut & Paste
24 Display Lines	Yes	No	No	No	No
Search & Replace	Yes	Yes	Yes	Yes	No
Variable Margin Settings	Yes	Yes	No	Yes	No
Imbedded Print-Format Commands	Yes	No	Yes	Yes	No
Preview Document to Screen	Yes	No	No	Yes	No
Normal Cursor Operation	Yes	Yes	No	No	No
Help Screens	Yes	Yes	No	Yes	No
Delete by Sentence	Yes	No	Yes	Yes	No
Delete by Paragraph	Yes	No	Yes	Yes	No
Use Function Keys	Yes	Yes	No	Yes	Yes
Full Line Headers, Footers	Yes	Yes	No	Yes	No
Copy, Move Text	Yes	Yes	Yes	Yes	Yes
Display Directory	Yes	Yes	Yes	Yes	Yes
Justify Text	Yes	Yes	No	Yes	No
Comment Lines	Yes	Yes	No	No	No
Undo Command	Yes	No	Yes	Yes	Yes
Integrate with Filer	Yes	Yes	No	No	No
Integrate with Calc	Yes	Yes	No	No	No
Suggested Retail Price	49.95	125.00	49.95	69.95	50.00

*Apple II specs used.
IPC version specs used.*

File Managers

Features/Benefits	Creative Filer	PFS Report & File	PhiBeta Filer	Data Manager II
Maximum Records per File	1300[1]	1000	250	660[4]
Maximum Fields per Record	100	50	10	20
Maximum Characters per Data Field	3920[2]	size of form	24	37[5]
Maximum Characters per Record	3920[2]	size of form	240	230
Maximum Files on Disk	144[3]	1	10	1
ISAM File for Fast Retrieval	Yes	No	No	No
Help Screens	Yes	No	No	No
Change Form Without Rewriting File	Yes	No	Yes	No
Report Writer Included	Yes	No	Yes	No
Select Records to Print	Yes	Yes	Yes	No
Derived Fields	Yes	Yes	No	No
Totals	Yes	Yes	Yes	No
User Defined Column Headings	Yes	No	No	No
Print Date and Page Number	Yes	No	No	No
View Catalog of Files	Yes	No	Yes	No
Integrate Report with Word Processor	Yes	N/A	Yes	Yes
Integrate Fields with Word Processor	Yes	N/A	No	Yes
Suggested Retail Price	49.95	149.90	49.95	49.95

[1]Limited only by capacity of disk.
[2]Limited only by number of directory entries allowed by DOS.
[3]Limited only by maximum size of form (98 lines.

[4]Longer field names also reduce amount of data that can be entered into data field.
[5]Calculated on the basis of one record per block.

Spreadsheets

Features/Benefits	Creative Calc	Multi-Plan	Visi-Calc	Insta-Calc	Practi-Calc
Rows	255	255	254	30[6]	254[7]
Columns	64	63	64	20[6]	100[6]
Variable Column Width for Any Column	Yes	Yes	No	No	No
Within Cell Editing	Yes	Yes	No	No	No
12 Digit Accuracy	Yes	Yes	No	No	No
Full-word Menus	Yes	Yes	No	No	No
Free Memory for Spreadsheet	30K	10K	10K	24K[8]	16K
List Directory on Screen	Yes	No	No	Yes	No
Format Text L/R/C	Yes	Yes	No	No	No
Dynamic Memory Allocation	Yes	Yes	Yes	No	No
Auto-recalc Available	Yes	Yes	Yes	No	No
Auto-adjust on R/C Deletion	Yes	Yes	Yes	No	No
Reference Cells by Moving Cursor	Yes	Yes	Yes	No	No
Maximum Formula Length	120	105	80	40	40
Integrate with Word Processor	Yes	Yes	No	No	No
Suggested Retail Price	49.95	99.95	99.95	39.95	54.95

[6]Commodore 80 32 version specs used.
[7]Size of Spreadsheet must be specified at program start–highly inflexible.
[8]Estimated.

CREATIVE SOFTWARE

960 Hamlin Court, Sunnyvale, CA 94089

These comparisons were made based on programs available and/or specifications given by the manufacturers at time of publication. Creative Software is not liable for omissions or inaccuracies and makes no representation with regard to the continuing accuracy of these comparison charts.

June 1985 Vol. 3, No. 6

FEATURES

Inside The 128: A Hands-On Look At Commodore's Newest Computer *Charles Brannon* .. 20 *
An Interview With Paul Goheen, Commodore's Software Director *Selby Bateman* ..... 30 *
The Prose And The Parser: How Writers See Games *Selby Bateman* ..... 39 *
A Guide To Commodore User Groups, Part 2 ..... 49 *

REVIEWS

Bank Street Music Writer *Philip Nelson* 72
Allegro *Philip Nelson* 73
Sky Travel *Harvey B. Herman* 74
Raid Over Moscow *Selby Bateman* 79

GAMES

The Freeze Factory *Clarence Din* 54 V/64
Squares *Douglas Fish* 58 64

EDUCATION/HOME APPLICATIONS

Computing For Families: Real World Software, Part 2 *Fred D'Ignazio* ..... 60 *
Character Assassination *Kent Brewster* 70 V/64

PROGRAMMING

BASIC Magic: GOTO And GOSUB *Michael S. Tomczyk* ..... 82 V/64/+4/16
Machine Language For Beginners: ML Mailbag *Richard Mansfield* 86 V/64
Dynamic SID Editor *Wayne Eastwood* 88 64
Hints & Tips: Screen Assistant *Jay Bromley* ..... 90 V/64/+4/16
Screen-40 *Peter Fortini* ..... 92 V
Relative Files: Speed And Economy *George W. Miller* ..... 95 V/64/+4/16
Power BASIC: Tape Program Rescue *John R. Hampton* 103 V/64

DEPARTMENTS

The Editor's Notes *Robert Lock* ..... 4 *
Gazette Feedback *Editors And Readers* ..... 8 *
Simple Answers To Common Questions *Tom R. Halfhill* ..... 80 *
Horizons *Charles Brannon* ..... 104 *
News & Products ..... 110 *

PROGRAM LISTINGS

Bug-Swatter: Modifications And Corrections ..... 106 *
How To Type In COMPUTE!'s Gazette Programs ..... 108 *
The Automatic Proofreader 109 V/64

Product Mart 130
Advertisers Index 143

* =General, **V**=VIC-20, **64**=Commodore 64, **+4**=Plus/4, **16**=Commodore 16.

COMPUTE!'s GAZETTE is published monthly by **COMPUTE!** Publications, Inc., Post Office Box 5406, Greensboro, NC 27403 USA. Phone (919) 275-9809. Editorial offices are located at 324 West Wendover Avenue, Greensboro, NC 27408. Domestic subscriptions: 12 issues, $24. Send subscription orders or change of address (P.O. Form 3579) to Circulation Dept., *COMPUTE!'s GAZETTE*, P.O. Box 961, Farmingdale, NY 11737. Second class application pending at Greensboro, NC 27403 and additional mailing offices.
Entire contents copyright ©1985 by **COMPUTE!** Publications, Inc. All rights reserved. ISSN 0737-3716.
COMPUTE! Publications, Inc., One of the ABC Publishing Companies: ABC Publishing, President, Robert G. Burton; 1330 Avenue of the Americas; New York, New York 10019.

THE EDITOR'S *notes*

People have been waiting for years for the Japanese to begin to compete for the American home computer dollar. Where are they? Why haven't they yet seriously impacted the U.S. personal computer market?

Timing, of course, could be one reason. The Japanese developed MSX, an operating system that lets you control other machines, like video recorders, with your computer. Two or three years ago, computers based on this system would likely have had a big impact in America. Not only are these systems inexpensive, they also allow you to run any MSX software on any MSX computer. No more wishing there was a Commodore version of that great Apple program. And MSX-based games can access impressive video effects directly from video recorders.

But at this year's Consumer Electronics Show, the MSX booth, while impressive, was largely ignored; the Japanese are still minor players in the American computer market.

Perhaps computer technology is developing too rapidly for anything but sheer technical breakthroughs to pull the market forward.

Some observers have claimed that Jack Tramiel more or less single-handedly preempted a significant Japanese impact when he announced the then-drastic price/performance ratio of the VIC-20 computer in 1980.

In his book *The Home Computer Wars*, GAZETTE columnist and former Commodore insider Mike Tomczyk recalls what it was like at the meeting in London when Jack announced the "people's computer."

> Jack stood up and pounded his fist once on the table. The room fell silent. Then slowly, in his deep booming voice, he said: "Gentlemen, the Japanese are coming—so we will become the Japanese!"
>
> We all listened attentively as Jack explained that several Japanese companies (known collectively as Japan, Inc.) were already poised to enter the U.S. market. Japanese companies had already captured the television, radio, and small car markets, and personal computers were next on their list.
>
> "We have to compete with ourselves," he warned. "Always. We have to be like the Japanese. We have to constantly come up with something new, something better. We have to believe that we are the competition. If we do this, no one can get ahead of us."

Jack Tramiel went on to produce the first color computer for under $300, and this might well have been the single most significant factor in delaying a Japanese home computer for American markets. But is the long-awaited invasion only delayed?

Last year there was considerable speculation that the MSX operating system would provide an entrée into America for low-priced computers from Panasonic, Yamaha, and other Japanese electronics giants. MSX *is* impressive in many ways. It's a fixed standard, so software can be designed to run on any MSX computer and will run flawlessly. The MSX version of BASIC is impressive and full of desirable features. The music capabilities of the Yamaha computer, in particular, far outshine anything available on current popular American computers.

But the time for MSX seems to have come and gone. The American computer companies are moving en masse to 16- and 32-bit computers. The heyday of the 8-bit computer is over as Macintosh-like, 68000-chip-based machines are coming onto the market from both Atari and Commodore. MSX is an 8-bit operating system: no pull-down menus, no icons, no high-speed processing, no easy way to address huge chunks of RAM memory.

Of course it would be perilous and foolish to assume that Sony computers will never appear on American desks next to the Sony radios and TVs. But so far, Jack Tramiel's dicta that we must compete with ourselves and must keep coming up with something new have proven effective in checking whatever marketing plans the Japanese companies might have entertained. Few would argue that Commodore's Amiga and Atari's ST computers have any serious competition as the most promising new machines on the current personal computing horizon.

Richard Mansfield

Senior Editor

Educational Software
That Works:

Spell.

Spell It!

Spell expertly 1000 of the most misspelled words. Learn the spelling rules. Improve with 4 exciting activities, including a captivating arcade game! Add your own spelling words.

ages 10 — adult / 2 disks: $49.95

Math.

Math Blaster!

Master addition, subtraction, multiplication, division, fractions, decimals and percentages — by solving over 600 problems. Learn your math facts with 4 motivating activities, including a fast-action arcade game! Add your own problems.

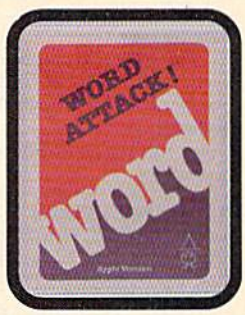
ages 6 — 12 / 2 disks: $49.95

Word.

Word Attack!

Add 675 new words to your vocabulary — with precise definitions and sentences demonstrating usage. Build your skills with 4 fun-filled activities, including an arcade game! Add your own words.

ages 8 — adult / 2 disks: $49.95



Read.

Speed Reader II

Increase your reading speed and improve comprehension! Six exercises designed by reading specialists vastly improve your reading skills. Chart your own progress with 35 reading selections and comprehension quizzes. Add your own reading materials.

high school, college & adult / 2 disks: $69.95

The Davidson Best Seller Tradition.

For your Apple, IBM or Commodore 64.
Ask your dealer **today**.

For more information call: (800) 556-6141
In California call: (213) 373-9473

Davidson & Associates, Inc.
6069 Groveoak Place #12
Rancho Palos Verdes, CA 90274

Davidson.

teacher certified NEA™

Apple, IBM and Commodore 64 are trademarks respectively of Apple Computers, Inc., International Business Machines Corp., and Commodore Business Machines, Inc.

COMPUTE!™ Publications, Inc. abc
One of the ABC Publishing Companies

Publisher Gary R. Ingersoll
Editor in Chief Robert C. Lock
Director of Administration Alice S. Wolfe
Senior Editor Richard Mansfield
Managing Editor Kathleen Martinek
Editor Lance Elko
Assistant Editor Todd Heimarck
Production Director Tony Roberts

Editors
Tom R. Halfhill, Editor, COMPUTE! Magazine; Stephen Levy, Editor, COMPUTE! Books Division; Gail Cowper, Production Editor; Ottis R. Cowper, Technical Editor; Charles Brannon, Program Editor; Selby Bateman, Features Editor
Assistant Editors
Gregg Keizer, J. Blake Lambert (Books); John Krause, George Miller, (Technical); Philip Nelson (COMPUTE! Magazine); Kathy Yakal, Feature Writer; Sharon Darling, Research Assistant (Features); Mark Tuttle, Submissions Reviewer
Editorial Programmers
Patrick Parrish (Supervisor), Tim Victor, Kevin Mykytyn, Kevin Martin
Programming Assistants
David Florance, Susan Doss
Copy Editors
Joan Rouleau, Ann Davies
Administrative Staff
Susan Young, Laura MacFadden, Julia Fleming, Iris Brooks, Jan Kretlow

Production
Irma Swain, Production Manager; Janice Fary, Art & Design Director, Lee Noel, Assistant Editor, Art & Design; De Potter, Mechanical Art Supervisor; Terry Cash, Carole Dunton, Typesetting
Artists
Larry Sullivan (Publications), Debbie Bray (Books); Harry Blair, Illustrator

Associate Editors
Jim Butterfield (Toronto), Harvey Herman (Greensboro), Fred D'Ignazio (Roanoke)

Circulation
Charles C. Post, Circulation Manager

Customer Service
Philippa King, Customer Service Manager; Gail Jones, Dealer Sales Supervisor; Judy Taylor, Customer Service Supervisor; Dealer Sales Staff: Rhonda Savage, Debi Goforth, Liz Krusenstjerna; Customer Service Staff: Betty Atkins, Gayle Benbow, Chris Gordon, Mary Hunt, Jenna Nash, Chris Patty

Lonnie Arden, Warehouse Manager; Staff: Howard Ayers, Steve Bowman, David Hensley, Larry O'Connor

Data Processing
Leon Stokes, Manager; Chris Cain, Assistant

Accounting
Paul J. Megliola, VP, Finance & Planning; R. Steven Vetter, Director, Finance & Planning; Robert Bean, General Accountant; Karen K. Rogalski, Financial Analyst; Staff: Dale Branch, Jill Pope
Credit
Barry L. Beck, Credit Manager; Staff: Sybil Agee, Anne Ferguson, Pat Fuller, Doris Hall, Linda Miller, Mary Waddell, Jane Wiggs
Purchasing
Gregory L. Smith, Purchasing Manager

Promotion
Caroline Dark, Promotion Assistant
Advertising Sales
Ken Woodard, Director of Advertising Sales; Bonnie Valentino, Assistant Advertising Manager; Patti Stokes, Production Coordinator; Kathleen Hanlon, Sales Assistant
Sales Representatives

Jerry Thompson	415-348-8222
Ed Winchell	213-378-8361
Harry Blair	919-275-9809

Jules E. Thompson, Inc.
National and Canadian Sales Representatives
1290 Howard Avenue, Suite 303
Burlingame, CA 94010

Address all advertising materials to:
Patti Stokes, COMPUTE!'s GAZETTE
324 West Wendover Ave., Suite 200, Greensboro, NC 27408

Sales Offices, The Thompson Company

New England	617-720-1888
Mid-Atlantic	212-772-0933
Southeast	919-275-9809
Midwest	312-726-6047
Texas	713-731-2605
Northwest, Nevada	408-354-5553
Northern CA	415-348-8222 or 408-354-5553
Southern CA	213-378-8361
Arizona	213-378-8361
New Mexico	213-378-8361
Colorado	303-595-9299

COMPUTE! Publications, Inc., publishes
COMPUTE! **COMPUTE! Books** ***COMPUTE!'s GAZETTE***

Corporate Office:
324 West Wendover Ave., Suite 200, Greensboro, NC 27408
Mailing Address:
Post Office Box 5406, Greensboro, NC 27403
Distribution Center
500-A Radar Road, Greensboro, NC 27419
Telephone: 919-275-9809
Office Hours: 8:30 AM to 4:30 PM Monday–Friday

Chief Executive Officer Robert C. Lock
President Gary R. Ingersoll
Vice President, Finance & Planning Paul J. Megliola
Executive Assistant Debi Nash
Assistant Anita Roop

Member ABC Audit Bureau of Circulations

Subscription Information

COMPUTE!'s GAZETTE Circulation Dept.
P.O. Box 5406, Greensboro, NC 27403

TOLL FREE
Subscription Order Line
800-334-0868
In NC 919-275-9809

COMPUTE!'s GAZETTE
Subscription Rates

(12 Issue Year): US (one year) $24. Canada, Mexico and Foreign Surface Mail $30. Foreign Air Mail $65.

The COMPUTE!'s GAZETTE subscriber list is made available to carefully screened organizations with a product or service which may be of interest to our readers. If you prefer not to receive such mailings, please send an exact copy of your subscription label to: COMPUTE!'s GAZETTE, P.O. Box 961, Farmingdale, NY 11737. Include a note indicating your preference to receive only your subscription.

Authors of manuscripts warrant that all materials submitted to COMPUTE!'s GAZETTE are original materials with full ownership rights resident in said authors. By submitting articles to COMPUTE!'s GAZETTE, authors acknowledge that such materials, upon acceptance for publication, become the exclusive property of **COMPUTE!** Publications, Inc. No portion of this magazine may be reproduced in any form without written permission from the publisher. Entire contents copyright © 1985, **COMPUTE!** Publications, Inc. Rights to programs developed and submitted by authors are explained in our author contract. Unsolicited materials not accepted for publication will be returned if author provides a self-addressed, stamped envelope. Where programs are included in an article submission, a tape or disk must accompany the submission. Printed listings are optional, but helpful. Articles should be furnished as typed copy (upper and lowercase, please) with double spacing. Each article page should bear the title of the article, date, and name of the author. **COMPUTE!** Publications, Inc., assumes no liability for errors in articles or advertisements. Opinions expressed by authors are not necessarily those of **COMPUTE!** Publications, Inc. **COMPUTE!** Publications assumes no responsibility for damages, delays, or failure of shipment in connection with authors' offer to make tape or disk copies of programs published herein.

PET, CBM, VIC-20, and Commodore 64 are trademarks of Commodore Business Machines, Inc., and/or Commodore Electronics Limited. Other than as an independent supplier of quality information and services to owners and users of Commodore products, **COMPUTE!** Publications, Inc., is in no way associated with Commodore Business Machines, Inc., or any of its subsidiaries.

WHEN YOU BUY TIMEWORKS SOFTWARE YOU GET MORE THAN SOFTWARE.

You get our Customer Technical Support Team

At the other end of our toll-free hotline, you'll find our full-time Customer Technical Support Team. With Timeworks, you get immediate answers . . . free of charge to all registered users. Our Timeworks experts help you use each of our programs to its fullest potential. Not everyone provides this necessary support, let alone for free.

You get our liberal Trade-Up Policy

If, at any time in the future, you wish to buy an updated version of any Timeworks program, or if you upgrade your computer system, you may exchange your original program for any other program we publish. Here's how:

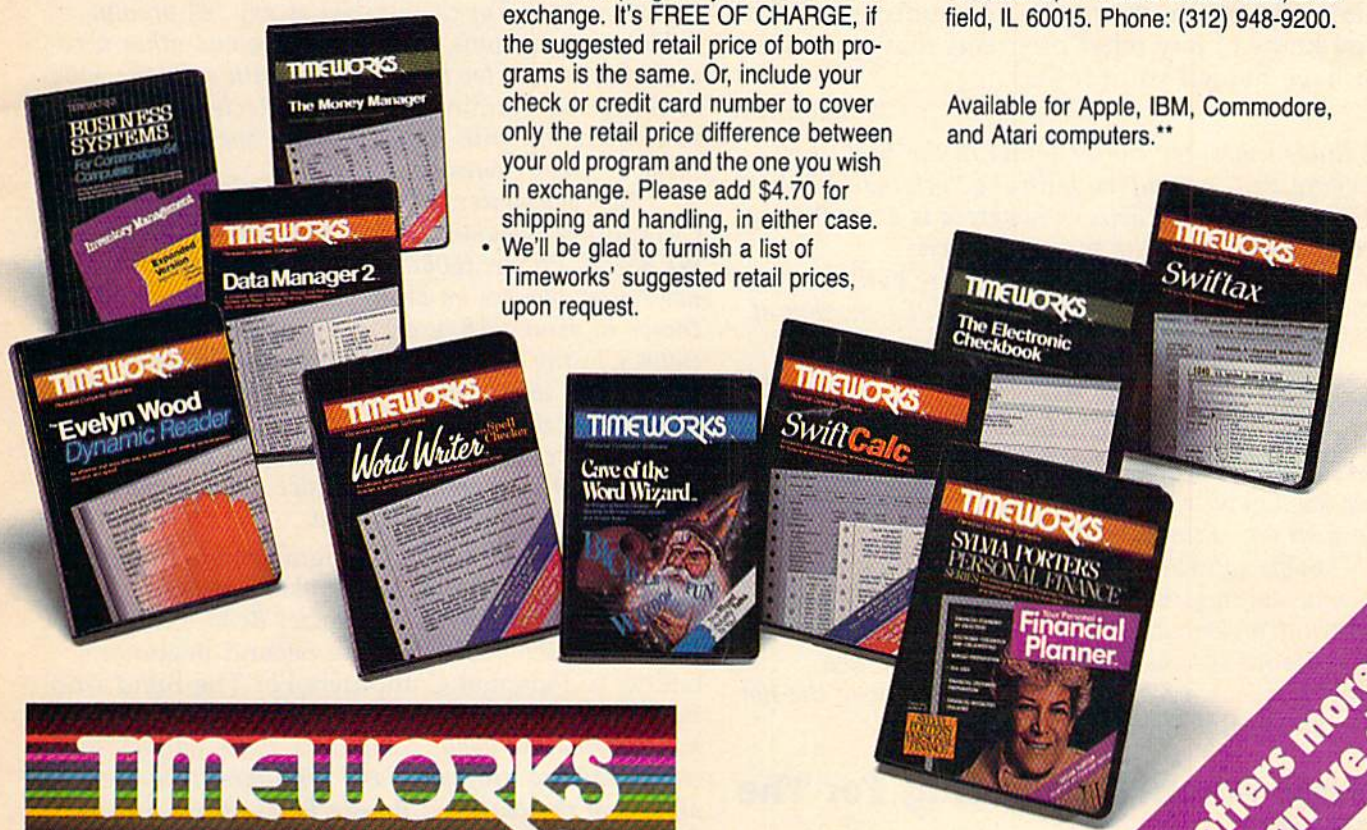
- Purchase your new Timeworks program at your favorite dealer.
- Send us the Timeworks program you wish to trade in, your paid receipt for the new program, and the title of the Timeworks program you would like in exchange. It's FREE OF CHARGE, if the suggested retail price of both programs is the same. Or, include your check or credit card number to cover only the retail price difference between your old program and the one you wish in exchange. Please add $4.70 for shipping and handling, in either case.
- We'll be glad to furnish a list of Timeworks' suggested retail prices, upon request.

You get our Money Back Guarantee

If you can find anything that works better for you, we'll buy it for you. Simply send us your Timeworks program, your paid receipt, and the name of the program you want, along with your check or credit card number for any retail price difference. If it's available, we'll send it to you.*

Look for these and other Timeworks programs at your favorite dealer. Or contact Timeworks, 444 Lake Cook Road, Deerfield, IL 60015. Phone: (312) 948-9200.

Available for Apple, IBM, Commodore, and Atari computers.**



TIMEWORKS®

More power for your dollar

Nobody offers more services than we do

* Offer valid for 90 days from date of purchase.

** Registered trademarks of Apple Computer, Inc., International Business Machines Corporation, Commodore Computer Systems, and Atari, Inc.

© 1985 Timeworks, Inc. All rights reserved.

GAZETTE FEEDBACK

EDITORS AND READERS

Do you have a question or a problem? Have you discovered something that could help other Commodore users? Do you have a comment about something you've read in COMPUTE!'s GAZETTE? We want to hear from you. Write to Gazette Feedback, COMPUTE!'s GAZETTE, P.O. Box 5406, Greensboro, NC 27403. We regret that due to the volume of mail received, we cannot respond individually to programming questions.

Secret Messages

We have discovered that the writer of Commodore's *EasyScript* either likes music or has a sense of humor. If you press f1, then CTRL-3, it plays the march "Pomp And Circumstance." Do you know of any other programs that play music or have hidden surprises?

Kevin Snow

A hidden message can be found in the first Commodore PET computers, with the "original ROMs." If you enter WAIT 6502, x (where x is a number between 1 and 255), the screen displays MICROSOFT!, x times. The PETs are built around a 6502 chip, and Microsoft wrote the PET version of BASIC.

A user group in Ireland has discovered something similar in the Plus/4 and 16. Type SYS 52651 and four names appear, perhaps the developers of BASIC 3.6. And if you try to enter or edit line number 350800 on a 64, the computer either locks up or does strange things.

Some software authors include secret messages or unusual bugs in their programs. If a case of copyright infringement is taken to court and the defendant claims it's just coincidence that the two programs look alike, the author can point to the not so coincidental music, message, or bug.

News About Computing For The Blind

In the February issue, "Gazette Feedback" included a letter from the teacher of a blind student whose family owned a 64. She asked if there was software available for blind 64 users. We have discovered that there are several dozen products, software and hardware included, for blind and handicapped computer users. Unfortunately, we do not have the space to list them all. Our thanks go to the several readers who responded with the following information about these helpful organizations:

The Library of Congress offers special services for blind and handicapped people, including information about computer software and hardware. The address is: National Library Service for the Blind and Physically Handicapped, Library of Congress, 1291 Taylor St. NW, Washington, DC 20542. Phone: (202) 287-5100.

Another good source of information is the CompuServe Handicapped User's Database, which features names and addresses of various non-profit organizations, details about commercial products, and articles about how handicapped persons are using computers. Type GO-HUD at any "!" prompt. Telecommunications on CompuServe and other services is possible for blind people, with software such as Smart 64 Terminal *(from Microtechnic Solutions) in conjunction with the COMVoice speech synthesizer (from Genesis).*

Two newsletters are also available: Raised Dot Computing Newsletter, *408 S. Baldwin, Madison, WI 53703. Phone: (608) 257-9595. This monthly newsletter focuses on blind computer users and comes in print ($18/year) and tape ($20/year) editions. Closing The Gap, P.O. Box 68, Henderson, MN 56044, (612) 248-3294, publishes a newsletter every other month. It features news about hardware and software for the handicapped. The publishers also sponsor an annual conference about computer technology for the handicapped.*

The Commodore 64 Programmer's Reference Guide *on cassette tape can be obtained from Recording for the Blind, 20 Roszel Road, Princeton, NJ 08540 (609) 452-0606.* The Second Beginner's Guide To Personal Computers For The Blind And Visually Handicapped *(in print, braille, or cassette) has information about computers, voice output, software, training programs, and resources. It is available from the National Braille Press, 88 St. Stephen Street, Boston, MA 02115, (617) 266-6160. Other computer-related books have been translated to braille by The National Braille Association, Braille Bookbank, 422 S. Clinton Ave., Rochester, NY 14620.*

Build a Book About You with

Build a Book About You.

Parents,

There's nothing else like Build a Book About You! You and your child can create two personalized storybooks, all about your child, neighborhood, friends, family, pets. And it's a great gift, too.

Build a Book About You includes everything you need to print out two stories on full-color pages and bind them in durable covers just like real illustrated children's books. But there are four stories on every disk. So with additional supplies, now available at your store, you can use your disk to build more books. Reuse the disk over and over!

This software works on all popular printers and the program is so simple even kids can use it to build their own books! Books about themselves; sure to strengthen reading skills because kids will want to read them again and again.

Build a Book About You is a project you and your child can work on together, one your whole family will enjoy.

Available for:
Apple II + /IIe/IIc
IBM PC/XT/PCjr
Commodore 64/128

Kids,

Here's how easy and fun it is:

1. Take out the disk and put it in your computer.

2. The computer asks you some easy questions. How old are you? Where do you live? What's your best friend's name? You can answer those, right? Mom and Dad might want to help you type the answers.

3. Then take the pages of the storybook — have you got them? Ask Mom or Dad to help you load them in the printer.

4. Press the button and watch your book print out. Wow! There's your name! This book is about you!

The Scarborough System.

© 1985 Scarborough Systems, Inc., 55 South Broadway, Tarrytown, New York 10591

For the name of the dealer nearest you, call 1-800-556-2283.

Blind and visually-impaired people can sign up for free correspondence courses (tape, braille, or large print), including some that cover computers, from Hadley School for the Blind. The address is 700 Elm St., Winnetka, IL 60093. Phone: (800) 323-4238 or (312) 446-8111 in Illinois.

Two other nonprofit organizations are Center for Computer Assistance to the Disabled (C-CAD) and Disabled Programmers, Inc. (DPI). Their addresses are: C-CAD, 2501 Avenue J, Suite 100, Arlington, TX 76011, (817) 640-6613; DPI, One West Campbell Avenue, Suite 36, Campbell, CA 95008.

Why Does The 64 Pause During Tape Loads?

I have owned a VIC-20 for almost three years. Now that our six-year-old is fighting the rest of us for equal time, we decided to purchase a 64 for the older folks. Your previously published columns have explained why the 64's screen blanks out during cassette operations, but I have never read why the 64 pauses between finding a program and reading it in. Is there any way to shorten the delay?

Larry Smith

Yes. When loading a program from tape and the screen says FOUND "PROGRAMNAME," press the Commodore key in the lower lefthand corner. The program will load without delay.

To make saving and loading even faster (tape at disk speeds), see "TurboTape" in next month's GAZETTE *or the January issue of our sister magazine,* COMPUTE!.

Cutting Off Fractions

In a few programs, I've seen a weird variable, B% (B Percent). What is it and how is it used?

Tom Roth

That's an integer variable. An integer is a whole number—no fractions or decimal points allowed. If you used something like B%=24/5 in a program, the value put into B% would be 4, not 4.8. Integer variables always cut off the fraction, rounding down to the nearest whole number. You can do the same thing to regular numeric variables with the INTeger function: B=INT(24/5).

Integer variables (but not integer arrays) take up the same amount of memory as floating point variables, the ones without a percent sign. And because the computer's math routines are written for floating point numbers, integers have to be converted before and after calculations, which makes them slower to add, subtract, multiply, etc. You cannot use integer variables as the index in a FOR/NEXT loop. Plus, integers cannot be less than −32768 or greater than 32767. If you try to go beyond this limit, you'll get an ILLEGAL QUANTITY ERROR.

With all of these disadvantages, why use integer variables at all?

There are really only two good reasons to use them. Integer arrays *take up much less memory (two bytes per element) than floating point arrays (five bytes per element). (Arrays are a special kind of variable where each item is assigned a number, or subscript.) If your BASIC program is running out of memory and you're using lists of numbers, try integer arrays, B%(9) for example. And if you're writing a machine language program that needs to pick up variable values from a BASIC program, integers are easier to work with because they're stored as a signed high-byte followed by a low-byte.*

A Short Circuit In The Joystick

When I play games with my joystick, they always read the direction as up. Is there some way I can fix the joystick?

Tom Bilan

A joystick contains five switches: up, down, left, right, and the fire button. Heavy use can damage the interior contacts, making them permanently open or closed. If your joystick is held together with screws, and if the switches are "bubble" contacts, you can open it up and pry apart the contacts with a pin. If this fails, you'll have to buy a new joystick.

Checking The Bank's Figures

I would appreciate seeing a program or formula that banks use in figuring interest compounded daily, monthly, or quarterly. For example, a $5000 certificate of deposit for 2 years at 10.35% interest.

Betty G. Carswell

*Finding 10.35% of a number is the same as multiplying by 0.1035. If the bank compounded annually, you could calculate the year's total with PRINT 5000 + (5000 * .1035) or, more simply, PRINT 5000 * 1.1035. But it's a rare bank that pays interest only once a year.*

Compounding 10.35% monthly means the bank pays you 1/12 of 10.35% twelve times a year. After the first month, you start earning interest on the interest. Try running the following short program:

```
10 P=5000:T=2:R1=.1035:C=12:R2=R1/C
20 FORX=1TOT*C:P=P+(P*R2):PRINTX;P,:NEXT
```

Line 10 defines the variables: P is principal, T is term (in years), R1 is the annual rate, and C is how often the interest is compounded (in this case, 12 times a year). Line 20 adds up the interest earned and prints out the intermediate amounts. You can change the variables for different situations; C = 365,

Fleet System 2.™
Word processing that *spells* V-A-L-U-E.

Complete word processing with built-in 70,000 word spell checking - Only $79.95

Up till now, you'd have to spend a minimum of about $70 to get a good word processor for your Commodore 64™. And if you added a small, *separate* spell checking program, you'd be out well over $100!

Now there's Fleet System 2! It's two powerful programs in one, and it's perfect for book reports, term papers or full office use.

Fleet System 2 combines the EASIEST and most POWERFUL word processor available with a lightning-fast 70,000 word spelling dictionary — all in one refreshingly EASY TO USE integrated system. Finally, spell checking is now available at your fingertips.

You can even add over 15,000 "custom" words to the built-in 70,000 word dictionary. And at a suggested retail price of $79.95, Fleet System 2 really spells V-A-L-U-E, and 70,000 other words too!

Fleet System 2 helps people of all ages to learn to *spell correctly* and *write better* too. It's the ONLY full featured word processor that provides you with helpful writing and vocabulary feedback such as: the total number of words in your document, the number of times each word appears, and total number of "unique" words, just to name a few.

Fleet System 2 has every important feature that will help you make child's play out of the most heavy duty typing tasks. There's Built-in 80 Column Display — so what you see is what you get, Horizontal Scrolling During Typing, Easy Correction and Movement of Text, Page Numbering, Centering, Indenting, Headers and Footers, Math Functions, Search and Replace, Mail Merge, BUILT IN 70,000 word SPELL CHECKING and much, much more!

Ask for Fleet System 2. Exceptionally Easy. Packed with Power. Perfectly Priced.

PSI Professional Software, Inc., 51 Fremont Street, Needham, MA 02194 (617) 444-5224 Telex: 951579

Fleet System 2™ is a trademark of Professional Software, Inc. — Fleet System 2™ was designed and written by Visiontronics, Ltd. — Commodore 64™ is a trademark of Commodore Electronics Ltd. — Some printers may not support certain Fleet System 2 functions and/or require an interface. Please check with your dealer. — Dealer and Distributor inquiries are invited.

for example, for daily compounding.

Your answers may vary slightly from the bank's, depending on if the bank rounds to the nearest penny or tenth or hundredth of a penny. For a more complete financial analysis program, see "Home Financial Calculator," in the May issue of our sister magazine, COMPUTE!.

Help From Commodore

I own one of the older 1541 disk drives and I've already had it serviced twice for head alignment. I want to know if Commodore has any type of exchange program for this model disk drive.

Karin L. Martinez

Beginning in March, Commodore established a new national network of 1500 service centers for in-warranty and out-of-warranty equipment. To find out which service center is nearest you, call the toll-free customer support line at 1-800-247-9000, Monday through Friday, 9 a.m.–midnight (Eastern Standard Time). Specific information, such as repair costs, was unavailable at the time of this writing.

You mentioned in your letter that you have an older model 1541, in the white case. The head alignment problem you've been having is not unique to the older models. In fact, many 1541s will go out of alignment with enough heavy use. Many 1541 owners have continued to use their drives, realigning them when necessary. One of the less expensive solutions is to purchase a software disk alignment package (see the October 1984 GAZETTE *for a review of one such product we've found to be consistently effective).*

How Much Memory Is Left?

Is there any PEEK or POKE that would show how much memory you have left on the 64?

Ruben Loera

*Enter PRINT FRE(0), on any Commodore computer, to find out how much memory remains. If you see a negative number, change it to PRINT FRE(0) + 2↑16. If you print the amount of free memory before running a BASIC program, then check free memory afterwards, you can find out how much was used for program variables. The FRE function can also be called from inside a program: 510 IF (FRE(0) − (FRE(0)<0) * 2↑16) < 200 THEN PRINT "LESS THAN 200 BYTES REMAINING."*

There are two causes of OUT OF MEMORY errors. The first is simply running out of memory; either the program is too long or you're using too many variables. The second way to run out of memory is filling up the stack. Every time you begin a FOR-NEXT loop or GOSUB to a subroutine, some important information is put in a section of memory called the stack. Using GOTO to jump out of a FOR-NEXT loop or a subroutine can leave "garbage" on the stack, wasting stack space, and eventually causing an error.

Tape To Disk Transfer

I've built up a large library of programs on tape. I wish to transfer them to my newly purchased disk drive. Is there a routine that automatically reads all programs from tape and puts them on disk?

George Persico

The following program copies a series of programs from tape to disk. Type the program in, save it, then run it and type NEW. If you know how many programs are on the tape, POKE the number into location 2. For example, to copy three programs type POKE 2,3.

If you are unsure of the number of programs, position the tape to just after the last program you want to copy then enter a one line program, like 10 END. Then SAVE "filename",1,2. This places an end-of-tape marker on the tape.

Now place a blank, formatted disk into the drive and type SYS 679. This program copies all program files, including machine language files, but it will not copy sequential files.

The program has no error checking in it and will crash if an error is detected.

```
10 FORA=679TO763:READB:POKEA,B:NEXT:END
20 DATA 169,64,133,3,169,1,162,1
30 DATA 160,1,32,186,255,169,0,32
40 DATA 189,255,169,0,32,213,255,173
50 DATA 60,3,201,5,240,54,201,4
60 DATA 176,226,230,3,165,3,141,80
70 DATA 3,169,16,162,65,160,3,32
80 DATA 189,255,169,2,162,8,160,2
90 DATA 32,186,255,173,61,3,133,251
100 DATA 173,62,3,133,252,174,63,3
110 DATA 172,64,3,169,251,32,216,255
120 DATA 198,2,208,176,96
```

Memory Must Be Continuous

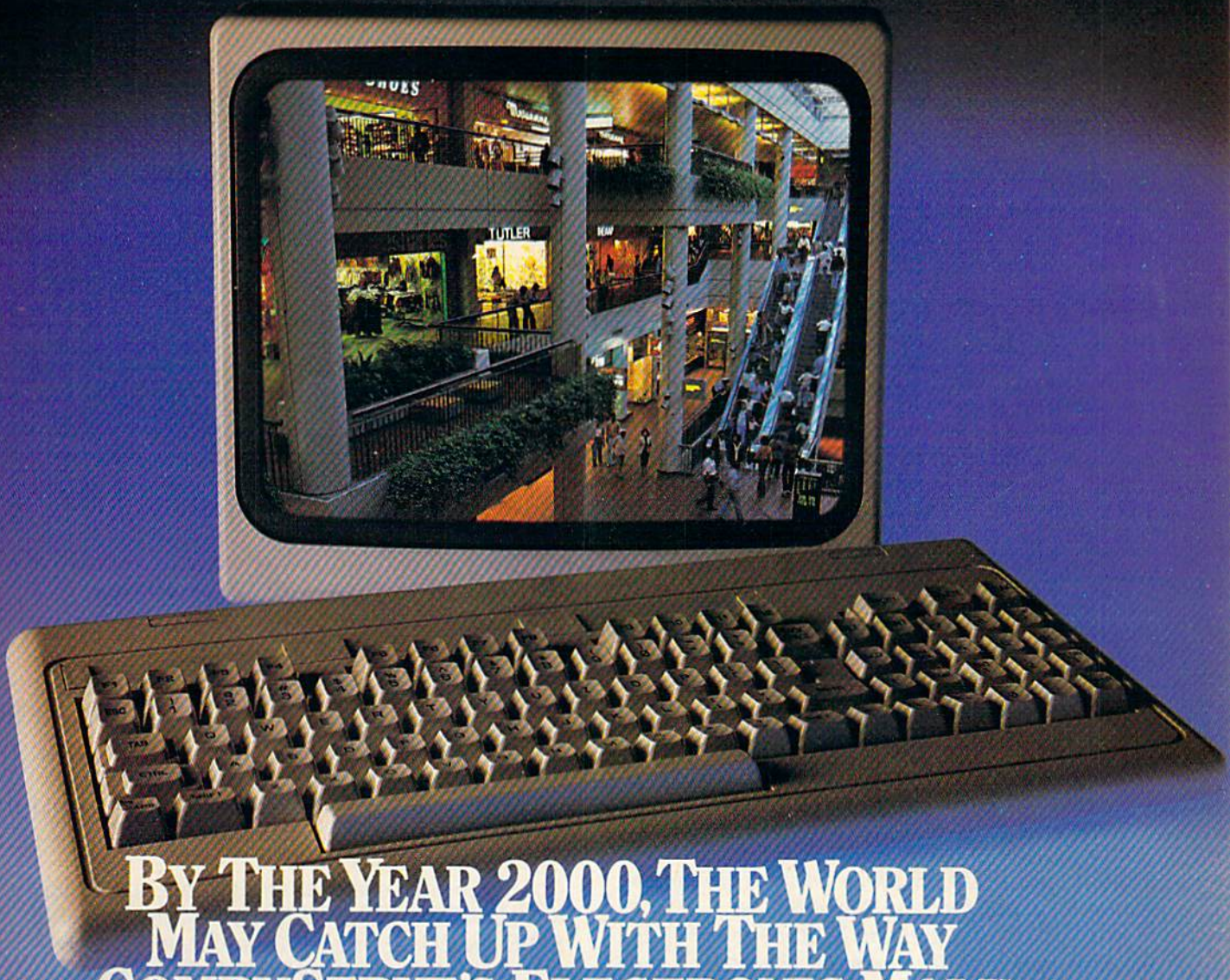
I own a VIC-20 and have 24K memory expansion. Each of three 8K banks has two choices for start address. I know that no 8K bank may have the same address as another bank or a cartridge. But when I use a program that requires expansion, which 8K banks should I select?

Darlene Fogal

When you turn on your VIC, it does a test to see how much memory is in place. It then prints the numbers of bytes available at the top of the screen. Memory used for BASIC programs must be continuous.

An unexpanded VIC uses locations 4096–8191, part of which is screen memory. If you add 8K, it should start at 8192. The next bank should start at 16384, and so on. Select these options if you're running a BASIC program that needs expansion.

Other Commodore computers follow similar



BY THE YEAR 2000, THE WORLD MAY CATCH UP WITH THE WAY COMPUSERVE'S ELECTRONIC MALL™ LETS YOU SHOP TODAY.

Presenting the computer shopping service that delivers discount prices, name-brand merchandise, and in-depth product information.

To make your computer even more useful, join CompuServe and shop in our Electronic Mall. Easy enough for beginners, it's open 24 hours a day, 7 days a week. And it offers a wide range of goods and services from nationally known stores and businesses including Bloomingdale's, Waldenbooks, American Express and Commodore.

CompuServe's Electronic Mall™ lets you shop at your convenience in all these departments:

The Auto Shop, Book Bazaar, Financial Mart, Leisure Center, Merchandise Mart, Newsstand, On-line Connection, Personal Computer Store, Record Emporium, Specialty Boutique and Travel Agency.

Take the CompuServe Electronic Mall 15-Minute Comparison Test.

What you can do in 15 minutes shopping the Electronic Mall way.

- Access descriptions of the latest in computer printers, for instance.
- Pick one and enter the order command.
- Check complete descriptions of places to stay on your next vacation.
- Pick several and request travel brochures.
- Access a department store catalog and pick out a wine rack, tools, toys...anything!
- Place your order.

What you can do in 15 minutes shopping the old way.

- Round up the family and get in the car.

The Electronic Mall—A Valuable Addition to the Vast World of CompuServe.

CompuServe Information Services bring you information, entertainment, personal communications and more.

You can access CompuServe with almost any computer and modem, terminal or communicating word processor.

To buy a CompuServe Subscription Kit, see your nearest computer dealer. To receive our informative brochure, or to order direct, call or write:

CompuServe

Information Services, P.O. Box 20212,
5000 Arlington Centre Blvd., Columbus, OH 43220

800-848-8199

In Ohio call 614-457-0802

The Electronic Mall™ is a service of CompuServe Inc. and L. M. Berry & Company.

An H & R Block Company

rules in how they use memory. In the 64, BASIC programs and variables use the continuous locations 2048–40959. There's another 4K of memory starting at 49152, but since it's not right next to BASIC memory, it cannot be used directly for programs and variables. Machine language programs are often put in this section of the 64's memory.

Checking For VICs

Would you please explain the purpose of the short routine that leads off some of the programs I see in your magazine? It begins with SYS 65517 and then PEEKs 781 to see if it contains a 40. Is this some kind of protective device? Under what conditions would location 781 not be equal to 40?

Dick Thompson

When programs are scheduled for the GAZETTE, *editors decide whether or not they should be translated for other computers. Some programs are completely rewritten. But other programs can be translated very easily by changing a few POKEs and formatting the screen for 40 columns on a 64, 22 on a VIC. Rather than printing two almost identical programs, we publish a single program that runs on both the VIC and the 64.*

Memory location 65517 is the beginning of the Kernal routine called SCREEN. The VIC, 64, Plus/4, and 16 use the same Kernal entry points, giving them a measure of compatibility.

If you JSR (Jump to SubRoutine) to 65517 in machine language, the computer checks the layout of the screen. The number of columns goes into the X register, the number of rows into the Y register. The BASIC equivalent of JSR is SYS.

Locations 780–782 are used by SYS for temporary storage of the A, X, and Y registers. PEEKing 781 after a SYS tells you the number from the X register (you can't actually PEEK a microprocessor register, but SYS has stored the most recent value of X into 781). Since the SCREEN routine puts the number of columns there, SYS65517: PRINTPEEK(781) will return 40 on a Commodore 64, 22 on a VIC-20.

It's a way for the program to check which computer it's using. Once the program knows if it's running on a VIC or 64, it makes adjustments for screen format and POKEs.

Double Density Disks

On the 1541 disk drive, formatting a single-sided single-density disk gives you 664 blocks free. Will a double density disk yield twice as many blocks? Also, is there any practical approach to using double-sided disks on the 1541?

James Bourgeois

A 1541 will work with either single or double density disks. Since the double density disks are of higher quality, you may have fewer problems if you use them. Besides, 1541 disk drives store more information than typical single density drives (they're sort of 1½ density). How much data fits on a disk depends on the disk drive, so double density disks will not increase the storage capacity of your 1541.

To answer your second question, true double-sided drives have two READ/WRITE heads, one for the top of the disk and one for the bottom. The disk always spins in one direction. To use both sides of a disk on a 1541 single-sided drive, you'd have to remove it and flip it over. Cutting open a disk reveals a felt-like cloth liner which catches dust particles. If the disk were to rotate backwards, the cloth that usually catches dust would redeposit it, with the potential of ruining the disk and the READ/WRITE head.

Programs Versus Variables

I can't figure out how to save a variable to disk. SAVE A$,8 doesn't work. I've read through the manual, but it doesn't help. How do I do this?

Jeff Alfeld

The BASIC commands for manipulating programs don't work with variables, and vice versa. For example, once a program is in memory, you can put it onto the screen with LIST. But you can't LIST a variable, you must PRINT it.

The SAVE command sends a program to tape or disk. LOAD, in turn, recalls a saved program. But SAVE and LOAD, like LIST, don't work with variables. They're commands that apply to programs only. In the example you gave, if A$ was "John Smith," SAVE A$ would save whatever BASIC program was currently in memory under the name John Smith.

To save a variable, you must open a file, print the variable, number, or string to the file (using PRINT#), and close it:

```
10 A$="THIS IS A TEST"
20 OPEN1,8,2,"TESTFILE,S,W"
30 PRINT#1,A$:PRINT#1,"END OF TEST":CLOSE1
```

The first number after OPEN in line 20 is the logical file number, which can be any number from 0 to 127. This number is used later in the PRINT# and CLOSE statements. It's followed by a comma and the device number (a disk drive is device 8). The third number is the secondary address. For disk files, the secondary address specifies the disk channel which will be used and must be in the range 2–14. The filename is followed by ",S,W" which means it is a sequential file to be written to.

When a disk file is opened, the red light on the drive turns on and stays on until the file is closed. You must always close files when you've finished with them.

Line 30 uses PRINT# to print a string variable

WE UNLEASH THE WORLD'S MOST POWERFUL GRAPHICS TECHNOLOGY.

To look at Infocom stories, you'd say they're all prose. No graphics. Ah, but there's more than meets your eyes.

We draw our graphics from the limitless imagery of your

imagination—a technology so powerful, it makes computer screen pictures look like

graffiti by comparison.

And no one knows how to unleash your imagination like Infocom. With thrilling plots. Unpredictable situations. And original puzzles calculated to drive you out of your skull.

Step up to Infocom. All words. No graffiti. The secret reaches of your imagination are beckoning.

It's time to open your mind's eye.

INFOCOM™

INTERACTIVE FICTION SOFTWARE

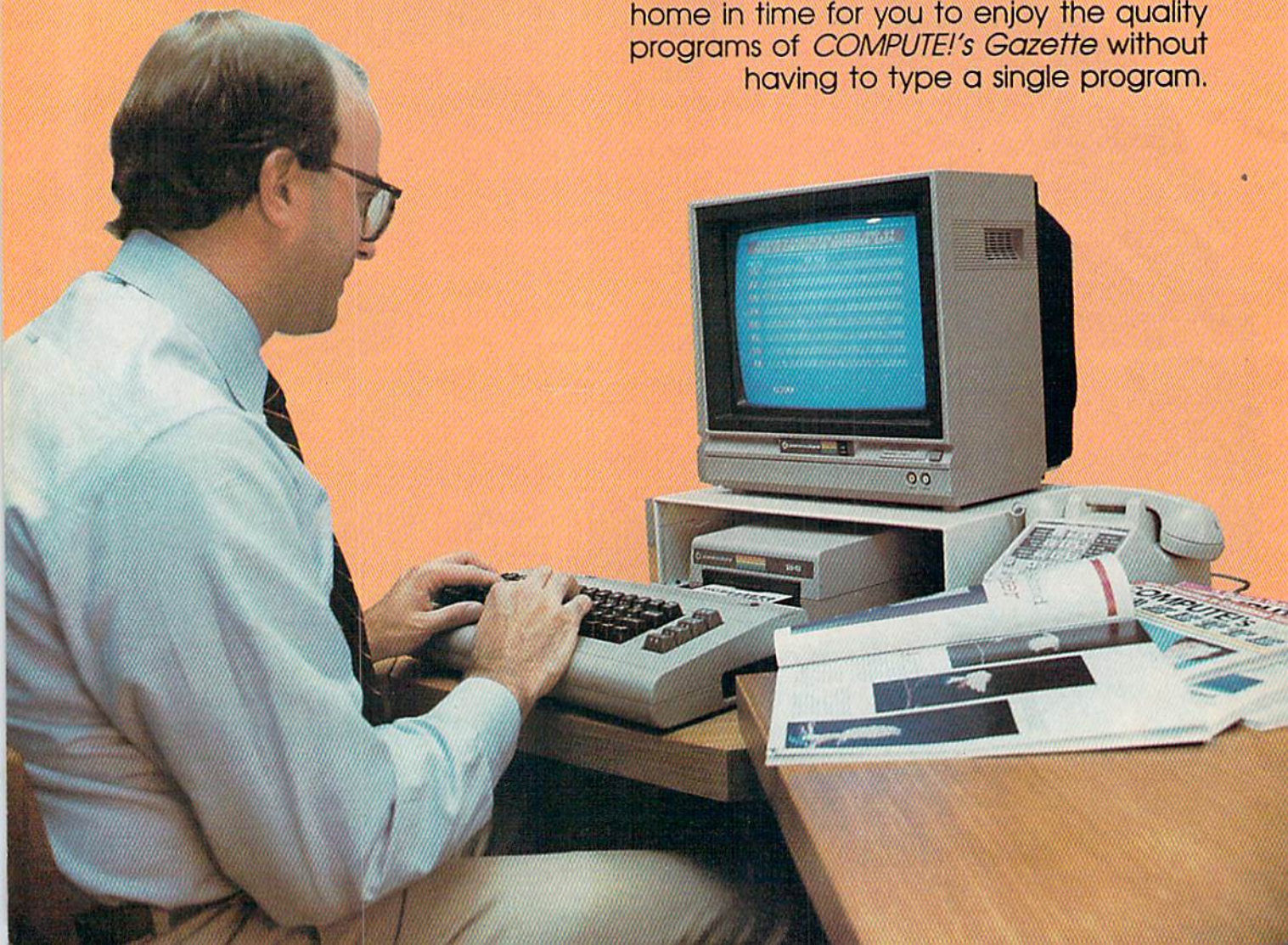
Infocom's interactive fiction is available for a wide variety of personal computers.

COMPUTE!'s *Gazette Disk*

Now you can enjoy the exciting programs from *COMPUTE!'s Gazette* on a ready-to-run disk

Every month you can receive *COMPUTE!'s Gazette Disk*, which includes the fascinating and challenging programs published in the corresponding issue of *COMPUTE!'s Gazette*, ready to load on your Commodore 64 or VIC-20.

The 5¼-inch floppy disk will arrive in your home in time for you to enjoy the quality programs of *COMPUTE!'s Gazette* without having to type a single program.

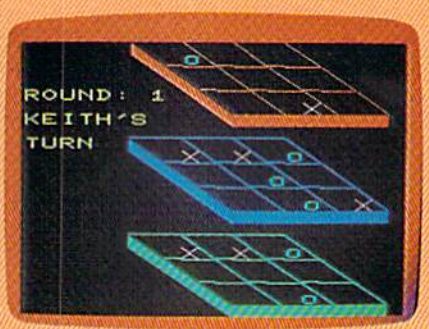


Timesaving

Using *COMPUTE!'s Gazette Disk* saves you time. Instead of spending hours typing in each program from *COMPUTE!'s Gazette*, you can load all the fun and fascinating programs in just a few minutes with the *Disk*. You have more time to enjoy Budgeteer, Mystery at Marple Manor, Vocab Builder, and many other exciting games and applications.

Inexpensive

And *COMPUTE!'s Gazette Disk* is inexpensive, only $69.95 for a one-year subscription. That means the *Disk* costs you $5.83 a month, a savings of 55 percent off the single disk price of $12.95. And what price can you put on the hours of typing time you save?



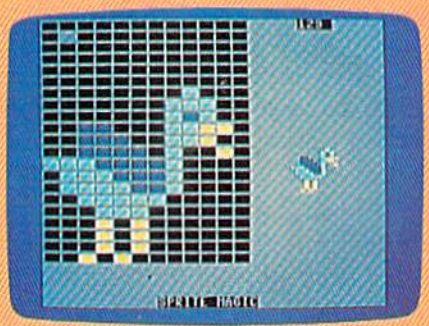
COMPUTE!'s GAZETTE DISK

Risk-Free

All *Disks* are fully tested before they're shipped to you. And full documentation for all programs is in the corresponding issue of *COMPUTE!'s Gazette*. But if you should have a problem with a disk, just call toll free 800-334-0868 and a member of our Customer Service Staff will assist you.

Convenient

COMPUTE!'s Gazette Disk gives you access. As soon as you read about a new and challenging program in *COMPUTE!'s Gazette*, you can load the *Disk* and begin usng it immediately—the *Disk* is ready when you are.



Enjoy the quality programs from *COMPUTE!'s Gazette* on the convenient, ready-to-use *COMPUTE!'s Gazette Disk*.

To order *COMPUTE!'s Gazette Disk*
Call toll free 800-334-0868 (in NC call 919-275-9809) or mail your prepaid coupon to *COMPUTE!'s Gazette Disk*, P.O. Box 901, Farmingdale, NY 11737

YES! I want to save time and money. Please enter my subscription to *COMPUTE!'s Gazette Disk*.

☐ Save 55% off the single issue price. 1 year subscription, $69.95

☐ Save even more! 2 year subscription, $129.95

All *Disk* orders must be prepaid.

☐ Payment enclosed (check or money order)
☐ Charge ☐ MasterCard ☐ Visa ☐ American Express

Acct. No. _____ Exp. Date _____
Signature _____
Name _____
Address _____
City _____
State _____ Zip _____
(Outside U.S. and Canada, add $36.00 per year for shipping and handling.)
Please allow 4–6 weeks for delivery.

356D02

and a string to the disk file.

To reverse the process, change the filename in line 20 to "TESTFILE,S,R" (R for read). Then, instead of PRINT#, use INPUT#1,A$: PRINT A$ twice, because there are two strings in the file.

Tape files work in a similar way. To open a file for reading, OPEN1,1,0, "TESTFILE" followed by PRINT# and CLOSE. To write, OPEN1,1,1, "TESTFILE" with INPUT# and CLOSE. When using tape, a secondary address of 0 means read, 1 means write.

Using INPUT# on strings longer than 80 characters will return a ?STRING TOO LONG error. In such a case, use GET# instead. It lets you read sequential files a character at a time.

Addressing An Envelope

I recently purchased a Gemini 10X printer and became frustrated trying to print an address on an envelope. The 10X has a paper sensor that turns off the printer when it runs out of paper.

The easiest way to remedy this is to slide a piece of paper under the flap behind the envelope. Then, friction feed the envelope and paper into the printer. It works great.

T. Dan Orr

Thanks for the tip. It will help our readers who have been stymied by the paper sensor. You can also disable the Gemini's paper sensor with OPEN 4,4:PRINT#4,CHR$(27);"8":CLOSE4. Or turn DIP switch 2–1 to OFF (with the power turned off, of course) to make the sensor nonfunctional.

Disabling *Simons' BASIC*

I have found that some programs will not work with the Simons' BASIC cartridge plugged in, possibly because they use the same memory locations. Is there a formula for turning Simons' BASIC on and off, so I don't have to remove it when I do not need it?

Brian L. Moore

The best way to disable Simons' BASIC *is to remove the cartridge entirely when you're not using it. A second way to disable a cartridge without removing it is to use an expansion board. These motherboards, as they are often called, allow you to plug many cartridges in at once. They have switches to let you turn any cartridge on or off.*

There is a third method, from Raeto West's book Programming the Commodore 64, *published by COMPUTE! Publications. Tap RUN/STOP-RESTORE and enter SYS 64760. When the screen shows the normal power-up message, run the following program.*

```
10 FORA=49152TO49159:READB:POKEA,B:NEXT:S
   YS49152:NEW
20 DATA 120,162,255,154,232,76,239,252
```

This is not foolproof—the RUN/STOP-RESTORE combination may cause a program crash. To reenter Simons' BASIC *type SYS 64738. SYS 49152 takes you back to standard BASIC. It's easier and more reliable to remove the cartridge before running any machine language or commercial programs.*

Disk Commands In Machine Language

I've been teaching myself machine language and have run into a problem with disk commands.

When formatting a new disk in ML, I imitate the BASIC command—OPEN15,8,15: PRINT#15, "N0:name,ID": CLOSE15—by using the Kernal routines SETLFS, SETNAM, OPEN, CHKOUT, and CHROUT. The red light turns on but the disk is not formatted. Is there some special way to send commands to the drive?

Vincent Dinh

Those five Kernal routines should work. You may be using SETNAM incorrectly, though. Its purpose is to set the name (hence SETNAM) of the file you want to communicate with, not *the name of the disk. And channel 15, the disk command channel, does not have a name, it's just channel 15. Also be sure you're sending a carriage return (CHR$(13)) after the command line. Clean things up with CLRCHN and CLOSE.*

When formatting a disk in BASIC, it's not necessary to use the PRINT# command. A shorter form is:

```
OPEN 15,8,15,"N0:name,ID":CLOSE 15
```

It's as if you were opening a file called "N0:name,ID." Simulating this in ML makes the translation simpler since it eliminates the need for the CHKOUT and CHROUT routines. The following machine language program will format a disk (note that this is source code, and must be used in conjunction with a machine language assembler):

```
20 SETLFS = $FFBA
30 SETNAM = $FFBD
40 OPEN{3 SPACES}= $FFC0
50 CLOSE = $FFC3
100 LDA #LENGTH:LDX #<COMMAND:LDY #>COMMA
    ND:JSR SETNAM
110 LDA #15:LDX #8:TAY:JSR SETLFS
120 JSR OPEN
130 LDA #15:JSR CLOSE
140 RTS
150 COMMAND .ASC "N0:NAME,ID":LENGTH =* -
     COMMAND
```

This program will not make the formatting process any faster than BASIC, however, because the program that formats disks is inside the disk drive. Whether you use BASIC or ML to send the command, the drive works at the same speed.

Break The BASIC Barrier

MACHINE LANGUAGE
COMMODORE'S HANDBOOK OF SIMONS' BASIC
ASSEMBLY LANGUAGE PROGRAMMING with the Commodore 64
COMMODORE 64 DATA FILES
A BASIC TUTORIAL
ASSEMBLY LANGUAGE PROGRAMMING with the Commodore 64

Now's the time to push forward — beyond BASIC and into fresh, exciting areas of exploration on your Commodore 64! Don't let BASIC be the limit, barring you from a multitude of valuable and wondrous discoveries. At Waldenbooks, we've got four new Commodore booktools designed to aid you in your quest to utilize every bit and byte of power your Commodore 64 has to offer. Four new ways to show you the sky's the limit!

Commodore's Handbook Of Simons' Basic
Jane G. Reh
A definitive reference/tutorial that provides programmers with all the information necessary to use Simons' BASIC well and make the most out of every command. Neatly organized into nine topic sections covering each of the over 100 Simons' BASIC commands, with a special emphasis on exploiting the superb graphics capabilities of Simon's BASIC. Includes numerous programming examples, an extensive index, and a Simons' BASIC Reference Card for quick information retrieval.
Brady/1985/224 pp/paper/
ISBN 0-89303-843-1/$12.95

Machine Language For The Commodore 64 And Other Commodore Computers
Jim Butterfield
This bestselling tutorial introduces programmers of all levels to the principles of machine language — what it is, how it works, and how to program with it! Explores machine code in the real environment of Commodore personal computers, examining important concepts such as output, subroutines, address modes, linking BASIC and machine language, memory maps of the interface chips, and much more!
Brady/1984/326 pp/paper/
ISBN 0-89303-652-8/$14.95

Commodore 64 Data Files: A Basic Tutorial
David Miller
Here's a step-by-step tutorial designed to take the mystery and misery out of learning to use the Commodore 64 file structure. Learn what files are, how to use them, and how to create your own sequential or random access files. Offers valuable techniques and shortcuts for the advanced programmer, too, plus useful programming examples from the areas of home, education, business, hobby, and investment. Also includes a thorough discussion of DIF files plus chapters on random access files, automatic, initial use, file-creation techniques, tape files, and more!
Reston/1984/428 pp/paper/
ISBN 0-8359-0791-0/$16.95

Assembly Language Programming With The Commodore 64
Marvin L. DeJong
Presenting a comprehensive introduction to assembly language for Commodore 64 programmers. This unique guide offers extensive coverage on how to understand, write, debug, and execute assembly language programs — complete with numerous exercises and problems designed to familiarize users with the instruction set of the 6510 microprocessor. Some important assembly language topics covered are data transfer instructions, logic operations, branches and loops, input/output, and applications using the 6567 video interface chip and 6581 sound interface device.
Brady/1984/296 pp/paper/
ISBN 0-89303-319-7/$14.95

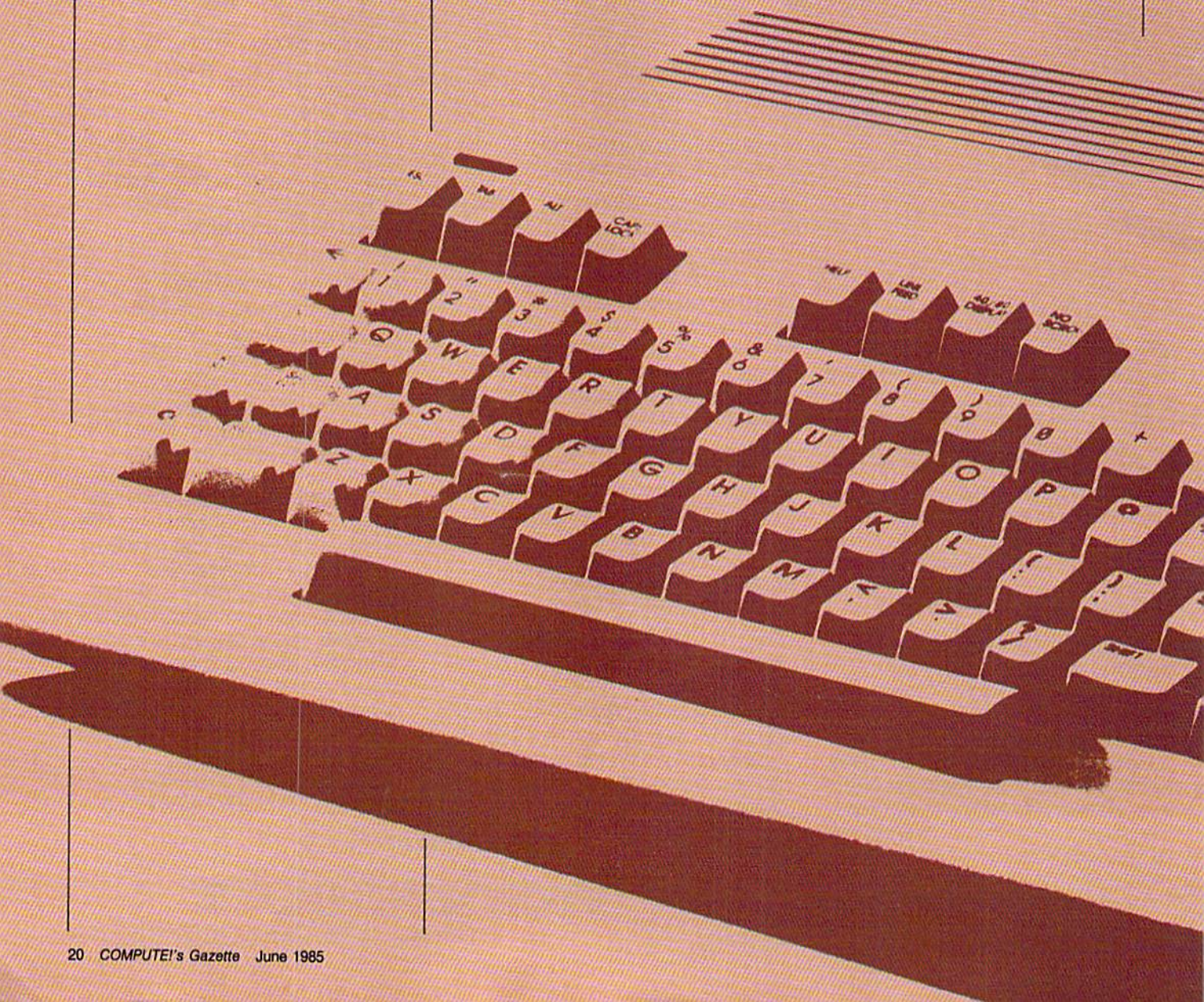
America finds it at

Waldenbooks®

Books • Audio • Video • Magazines • Software • Book Clubs • Special Services

INSIDE THE 128

The new Commodore 128 Personal Computer has generated quite a bit of interest, especially by current owners of the popular Commodore 64. Is the 128 a significant enhancement, or just a warmed-over 128K version of the 64? We went to Commodore's headquarters to find out, and came back with a new appreciation for this intriguing machine.



A Hands-On Look At Commodore's Newest Computer

Charles Brannon, Program Editor

Soon after it was introduced, the Commodore 64 proved to be the leader of a new wave of home computers. Even at the original price of $600, the 64 came equipped with as much memory as $2000 business machines, along with arcade-quality graphics, detailed animated sprites, and a unique sound synthesizer that brought realism to what was formerly just bleeps and tones. The 64 became one of the most popular computers ever, selling over 2,000,000 units worldwide.

The 64 is firmly established, with over 6,000 programs to its credit. But as good as the 64 is, we've been waiting three years for an encore. Although it's been high time for an enhancement, no one wants to give up his or her personal software library. Commodore's answer, the Commodore 128 Personal Computer, provides true 64 compatibility, plus a real advance in power and flexibility. The Commodore 128 is literally three computers in one: a Commodore 64 with the familiar 40-column display, sprites, SID chip, and BASIC V2; an enhanced 64

with 128K and all 64 features, plus 80 columns and BASIC 7.0; and a true CP/M-compatible machine, promising the ability to run off-the-shelf CP/M software. And all at a price almost anyone would call reasonable: under $300.

Compared to the 64, the 128's console is much bigger, perhaps to imply more power, but probably necessary to hold the hardware of three computers. The main part of the keyboard is identical to the 64's, except that the function keys have been moved to the upper-right corner and rearranged horizontally. There is a numeric keypad with +, −, ., and an ENTER key (synonymous with the RETURN key). Along the top of the keyboard are ESC, TAB, ALT, CAPS LOCK, HELP, LINE FEED, 40/80 DISPLAY, and four separate cursor keys.

None of these additional keys, not even the keypad or separate cursor keys, function in the 64 mode, for the sake of true compatibility. Adding extra programming in ROM to support these keys in 64 mode might be just enough to prevent some 64 software from working properly. Commodore is staunch on this; anything less than 100% compatibility isn't good enough.

In the 128 mode, the 40/80 DISPLAY key selects which screen mode is used as the default. This key is checked at power-on, when RUN/STOP–RESTORE is pressed, or when the RESET button (found next to the power switch) is pressed. This key has no meaning in 64 mode since 80 columns are not available, again for the sake of compatibility. In either 128 or CP/M mode, the same VIC chip used on the 64 displays 40 columns, graphics, and sprites. The 40-column screen can only be seen on a TV or composite monitor, not on the RGB display.

The RGB monitor displays twice as many pixels and characters as 40 columns, and achieves color purity since the signal is separated into the red/green/blue color components. (A composite signal has all the color information mixed together, which makes it difficult to cleanly separate these colors.) A special video chip is used for 80 columns. The 80-column screen can only be seen on the RGB monitor. All 16 colors are available in 80 columns (although the Commodore-1 color, normally orange, appears as dark purple), as well as reverse video and underlining. Unlike the 40-column mode, there are 512 characters available in 80 columns, which means you can get both uppercase, lowercase, and all keyboard graphics simultaneously.

This 80-column chip is for text only—it does not support bitmapped graphics or sprites. You can redefine the character set, though, and set up a small 640 × 48 simulated bitmapped window. The 80-column video chip uses 16K of dedicated screen memory. None of the 128K memory is used for 80 columns, so in effect this machine actually has 144K of total RAM.

There are three ways to switch between 40 and 80 columns: toggle the 40/80 switch and press RUN/STOP–RESTORE, press ESC-X in BASIC, or enter the command SCREEN 0 for 40 columns, or SCREEN 5 for 80 columns. Remember that these screens are independent. If you have two monitors hooked up, these commands reroute screen printing to the appropriate screen (although both screens remain displayed). Commodore's 1902 monitor is ideal for the 128; it has built-in color composite video, split signal composite video (as used on the rear connections of the 1701/1702 monitor), IBM-compatible RGB, and analog RGB (for use with the Amiga). With the 1902, you must manually flip a switch after you change screen modes.

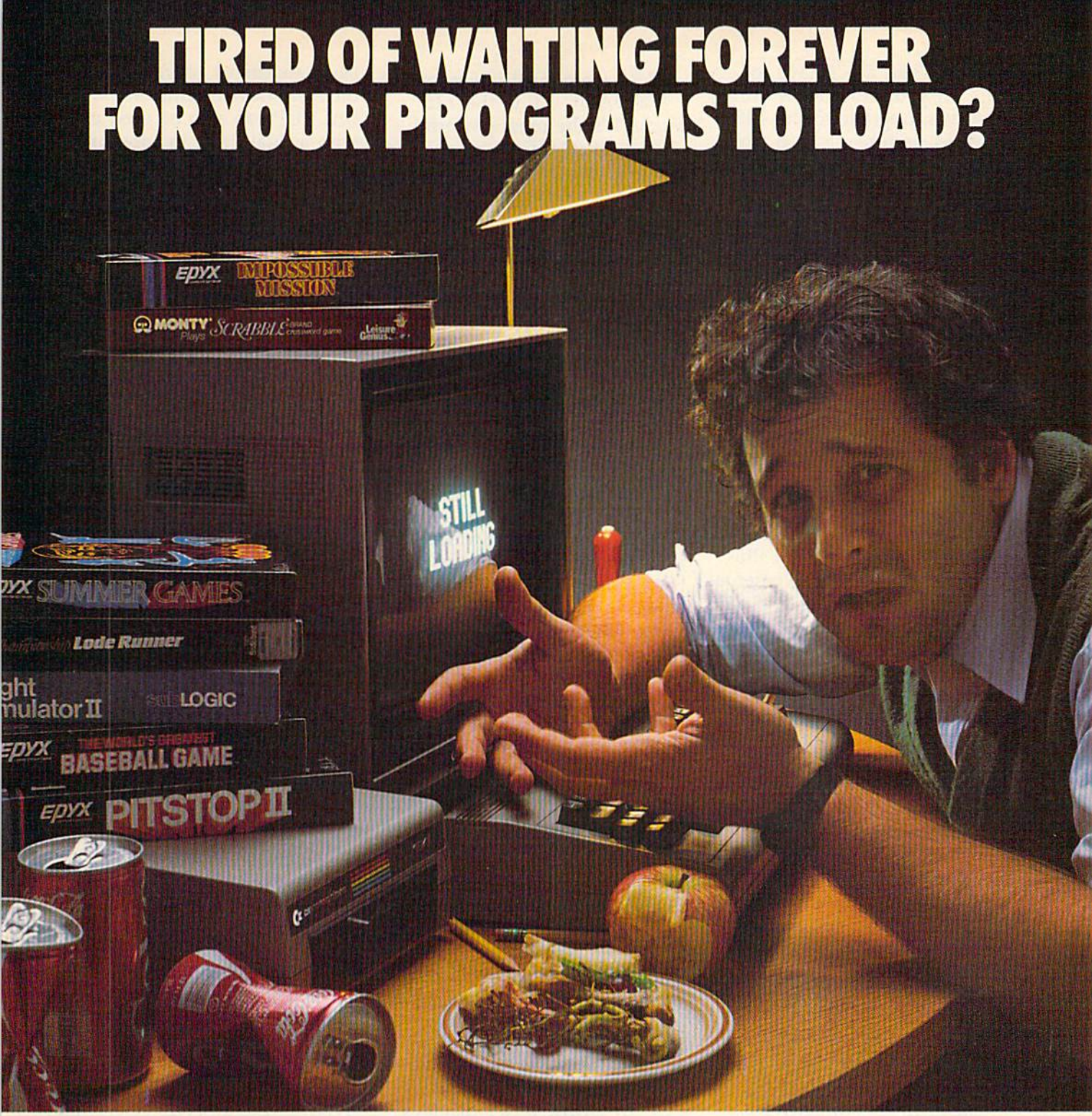
This can be cumbersome, but Commodore feels that you'll probably stay in one mode or the other, a reasonable assumption. This scheme does let you have two simultaneous displays. Perhaps one screen could show color graphics, while your program listing is displayed on another. One can envision dual-perspective games with each player having his own independent screen.

The 1902 composite/RGB display will probably sell for under $400. The least expensive route, though, is to use a television for 40 columns, and a monochrome (black and white) monitor for 80 columns. Commodore will sell a special cable to connect the RGB port to a monochrome monitor. The cable can be used with Commodore's inexpensive 1901 monochrome display and with other monochrome monitors.

The new 1571 disk drive further amplifies the power of the 128. In 64 mode, the 1571 behaves just like a 1541. The 1571 we worked with was not quite ROM-compatible with the 1541 (our "TurboDisk" program did not work with it), but we were assured that 1541 compatibility, a high priority, was being improved. In the 128 mode, the 1571 shows its true power, boosting storage capacity to 360K (as opposed to 170K on the 1541), and transferring data from seven to ten times faster than the 1541.

The enhanced storage is due to the 1571's double-sided design (there are two read/write heads), so you'll have to use the somewhat more costly double-sided disks. You can still use a 1541 in the 128 mode, and the 1571 can be programmed to be 1541 compatible in the 128

TIRED OF WAITING FOREVER FOR YOUR PROGRAMS TO LOAD?



INTRODUCING THE FAST LOAD CARTRIDGE FROM EPYX.

You're tired of waiting forever for your Commodore 64 programs to load. But it's no use glaring at your disk drive. Calling it names won't help, either. It was born slow — a lumbering hippo. You need the FAST LOAD CARTRIDGE from EPYX. FAST LOAD transforms your Commodore 64 disk drive from a lumbering hippo into a leaping gazelle. With FAST LOAD, programs that once took minutes to load are booted up in a matter of seconds.

FAST LOAD can load, save and copy your disks five times faster than normal. It plugs into the cartridge port of your Commodore 64 and goes to work automatically, loading your disks with ease. And that's only the beginning. You can copy a single file, copy the whole disk, send disk commands, and even list directories without erasing programs stored in memory.

And unlike other products, the FAST LOAD CARTRIDGE works with most programs, even copy protected ones, including the most popular computer games.

The FAST LOAD CARTRIDGE from Epyx. Easy to insert, easy to use and five times faster. So why waste time waiting for your disks to load?

Speed them up with FAST LOAD!

EPYX™

mode. So you don't have to write off your current disk drive when you upgrade to the 128. Other 64 peripherals also work with the 128, so hold on to your printer and modem if you upgrade.

The 1571 is also optimized for the CP/M mode, although you can use a 1541 drive in the CP/M mode. In CP/M mode, the 1571 can store 410K. Commodore has designed a new version of CP/M called CP/M Plus, which gives newly written CP/M applications the ability to access VIC-chip graphics and sprites, RGB color 80 columns, and the SID sound synthesizer—snazzy features for a CP/M machine. Unlike Commodore 64 CP/M, CP/M Plus is a true native Z80 implementation. The entire system resources are available to CP/M Plus, since the Z80 stays in control. Commodore is busy converting CP/M disks to 1541 format so that they will run both on the 128, and on 64 CP/M with a 1541 drive. But the new drive can be reprogrammed to read many disk formats. When we visited Commodore, it was not known which disk format would be used by default, but a configuration program can be used to let the drive read common CP/M formats, including disks formatted for Osborne and Kaypro machines.

As long as programs conform to CP/M portability guidelines, you'll be able to insert off-the-shelf CP/M software and boot it up (though this won't take advantage of the enhanced options of CP/M Plus). We brought some Osborne disks along with us to Commodore, but the 1571 drive we used was not modified to read our disks, so we were unable to verify this. Commodore indicated that several CP/M software manufacturers were interested in developing new CP/M software for the 128.

We were most impressed by BASIC 7.0 in the 128 mode. It's the most powerful version of BASIC we've seen for personal computers, topping even IBM's Advanced BASIC. With Commodore 64 BASIC as its foundation, it combines the best of *Simons' BASIC*, *Super Expander*, Plus/4, and Disk BASIC 4.0 commands, as well as new commands written especially for the 128. There are over 80 new commands and functions. At the time we visited Commodore, programmers were adding even more commands. And all 128K is available for programming: 64K for the length of your BASIC program, and 64K for storage of variables, strings, and arrays (minus the memory used by the operating system and 40-column screen map). The only thing missing is long variable names; you're still limited to two significant characters.

All disk commands from BASIC 4.0 are supported, permitting 128 owners to run some CBM 4032/8032 programs. These commands replace the need for OPEN 15,8,15: PRINT#15,"command": CLOSE 15. Most disk commands can be used with a dual-drive disk system (with the drives called 0 and 1), and with several drives addressed with different device numbers. SHIFT–RUN/STOP defaults to the disk drive, loading and running the first program on the disk. DLOAD and DSAVE are used to retrieve and store BASIC programs. CATALOG or DIRECTORY displays the disk directory without erasing any program in memory. SCRATCH lets you erase files from disk, but first asks ARE YOU SURE? HEADER is used to format (new) a disk.

COLLECT performs a Validate, freeing up any improperly allocated sectors. COPY and CONCAT let you copy or combine disk files on the same disk or between drives on a dual-drive system (but not with separate drives addressed with different device numbers). BACKUP can also be used only with a dual drive to copy one disk to another. APPEND lets you add new data to an existing file. DOPEN and DCLOSE makes file handling easier, and RECORD makes relative files a breeze. The reserved variables DS and DS$ let you examine the disk error channel. DCLEAR clears all open disk channels.

There's a complete set of programming tools. AUTO starts automatic line numbering, DELETE erases program lines, HELP shows the offending statement after an error message, RENUMBER permits you to renumber any part of a program, TRON and TROFF toggle trace mode, and KEY lets you display the current function key definitions or define your own function keys. You can also conveniently convert from hexadecimal to decimal or vice versa with the functions HEX$ and DEC. In addition to AND and OR, you can now perform a bitwise Exclusive OR (XOR).

Structured programming enthusiasts need never use GOTO again. IF/THEN now has an ELSE clause, as in IF A=1 THEN PRINT "A IS 1":ELSE PRINT "A IS NOT 1." BEGIN/BEND lets you set aside a block of lines that are executed only if a preceding IF/THEN works out as true. DO:LOOP UNTIL, DO:LOOP WHILE, DO UNTIL: LOOP, and DO WHILE:LOOP all execute a block of commands *while* a certain condition is true, or *until* a certain condition proves to be false. EXIT can be used to skip out of a loop.

RESTORE can now be followed by a line number to let you start reading any section of DATA.

TRAP transfers execution to a specified line number when an error occurs. Your program

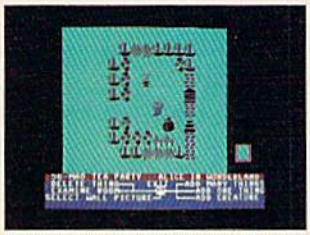
[This isn't just hype. We really do have the money.]

WANTED:

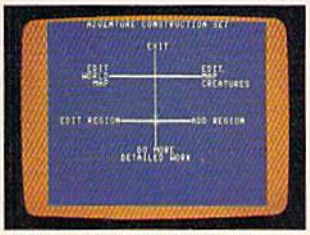
WORLD'S GREATEST ADVENTURES.

REWARD: $1000 *and* FAME. CALL (800) 227-6703.

ACS is your tool kit. More than 7000 parts to build from. Power to spare!

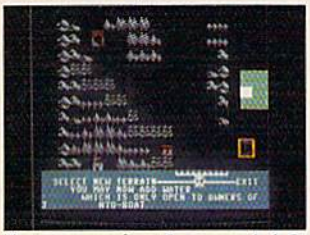


Or make your own parts from scratch. Draw 'em. Give 'em properties. Go for it!



ACS is menu driven. It works with a positive "stick shift" controller. Easy as pie!

Ready-made segments of sci-fi, mystery & dragon-type adventures included. A real bargain!



Mountains, oceans, forests & etc. are pre-built. Or make your own landscapes. You're the boss!

Amazing fact #1: ACS makes adventures (& finishes parts of yours) by itself. This is No Lie!

Music modules & sound effects included. Score your adventures like movies. Be a maestro!

No arms control here! Endless weapons of your design. (Endless armor & cures, fortunately.)

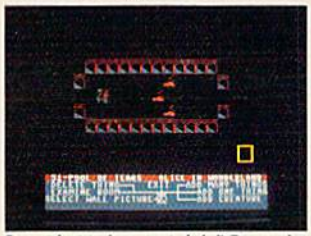
Complete, top-notch epic adventure included: *Rivers of Light* by Stuart Smith, author of *Ali Baba!*

500 obnoxious creatures thrown in! Or make your own. Point 'em at the population! See their priorities!

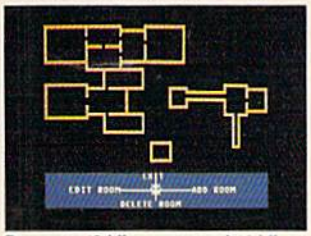
You get magic! 31 variations on 15 Big Spells! You get technology. You get religion. All right!

Amazing fact #2: ACS integrates text and graphics. All other products wimp out in this regard.

Characters? How many you want? Make 'em. Break 'em. Cast them into the world without a dime!



7 tutorial mini-adventures included! Generously survivable for those tentative first timers!



Design up to 15 different regions with 16 different rooms in each one. Space out!

When you've made a zippo-zocko GREAT ADVENTURE, send it here. You could win 1,000 smackers!

ADVENTURE CONSTRUCTION SET™

from ELECTRONIC ARTS™

HOW TO WIN: Send your adventure entries to Electronic Arts by 12/30/85. 3 winners will be selected by our judges. Their decision: final. Your adventure becomes "public domain" which means you can still get famous even if you don't get rich. **HOW TO ORDER:** Visit your retailer or call 800-227-6703 for direct VISA or MasterCard orders **(in CA call 800-632-7979).** To buy by mail, send check or money order to Electronic Arts, P.O. Box 306, Half Moon Bay, CA 94019. Add $3 to cover insured shipping and handling. Indicate desired machine version. Allow 1-4 weeks for delivery. *All EA products purchased direct have a 14 day "satisfaction or your money back" guarantee.* **PRICE & MACHINE AVAILABILITY:** C-64 $39.95. To receive our complete product catalog and direct order form, send 50¢ and a self-addressed, stamped envelope to Electronic Arts, Catalogue Offer, 2755 Campus Drive, San Mateo, CA 94403.

can examine the error number in the reserved variable ER, the number of the line that caused the error in EL, and the error message with the function ERR$. After you've handled the error, RESUME returns control to the statement after the error, or to any line number.

Text processing is enhanced with INSTR, which finds the position of a substring within a larger string. PRINT USING lets you define a format field for printing, making it easy to set up columnar tables and forms. WINDOW sets up a smaller screen that scrolls independently from the rest of the screen. WINDOW can be used to emulate simple Macintosh-style windowing.

No more POKEs for SID chip sound. BASIC 7.0 includes several commands for music and sound effects. SOUND sets the frequency, duration, and waveform of a sound effect. You can also specify a sweeping effect. PLAY is a mini-language of its own. You can use it to play strings of notes, specifying note names, durations, sharps/flats, dotted notes, and rests. You can use it to synchronize three-voice music, set the filter, and control individual volume for each voice. Each voice can play from a set of predefined envelopes that simulate one of ten musical instruments: piano, accordion, calliope, drum, flute, guitar, harpsichord, organ, trumpet, and xylophone. You can customize these preset instruments with ENVELOPE, customize the programmable filter with FILTER, set the overall VOLume, and the TEMPO of music.

BASIC 7.0 offers a rich vocabulary of graphics commands. GRAPHIC is used to enter either the multicolor 160 × 200 graphics screen, the hi-res 320 × 200 graphics screen, the 40-column text screen, or the 80-column text screen. GRAPHIC allows you to define a text window and can either clear the screen or leave previous graphics in place. SCNCLR can also be used to clear the screen. When you enter a graphics mode, the start of BASIC is moved beyond the end of the graphics screen. GRAPHIC CLR is used to deallocate the memory used by the graphics screen. RGR returns the number of the current graphics mode.

DRAW is used to plot a single point, or draw a single or a connected line to create complex shapes. LOCATE is used to set the position of the graphics cursor without plotting any point. BOX can draw any rectangle or filled rectangle, at any angle. CIRCLE is used to draw circles, ovals, arcs, or any polygon, at any angle of rotation. You can place text anywhere on the graphics screen with CHAR. You can also use CHAR on the text screen to simulate PRINT AT. COLOR is used to set any of the color registers, and the function RCOLOR reads which color is assigned to a color register. PAINT can fill any shape with any color. S SHAPE can "pick up" any block of the screen and store it in a string. This shape can then be copied back to any place on the screen with G SHAPE.

A pixel can be tested with the function RDOT, which returns the color of the pixel at the specified row and column. The WIDTH command specifies the size of pixels plotted. A WIDTH of 2 makes all lines double-wide. And finally, the SCALE command lets you pretend that the screen is actually 1024 × 1024 pixels across and down. You can use this range in your drawing statements, and the coordinates are automatically scaled to fit the actual screen size.

BASIC 7.0 just wouldn't be complete without sprite commands. If you've been stymied by POKE and PEEK for sprite control, as well as the infamous "seam," you'll really appreciate the following sprite commands.

First, BASIC 7.0 includes a simple sprite editor. Just type SPRDEF, and a box appears on the screen. Enter which sprite you'd like to define, then use the cursor keys and the number keys 1–4 to draw squares on the grid. When you're through, the sprite is stored into a reserved section of memory. This memory can be saved to disk with BSAVE, then recalled within your program with BLOAD, eliminating the need for DATA statements.

To set up sprite parameters, use SPRITE. This command turns on the sprite, sets its color, priority, initial X and Y position, and sets hi-res or multicolor for that sprite. You can then use MOVSPR to position the sprite anywhere on the screen. MOVSPR can also be used to set the sprite into motion. After you specify the speed and angle, the sprite moves on its own. Your program continues in the meantime. (Sprites are updated in this mode during the IRQ interrupt.) While a sprite is in motion you can read its position with RSPPOS. You can transfer the sprite pattern into any string, or copy a sprite pattern from a string into any sprite. In combination with SSHAPE and GSHAPE, you can "pick up" a block of the screen and turn it into a sprite, and "stamp" the sprite pattern anywhere on the graphics screen.

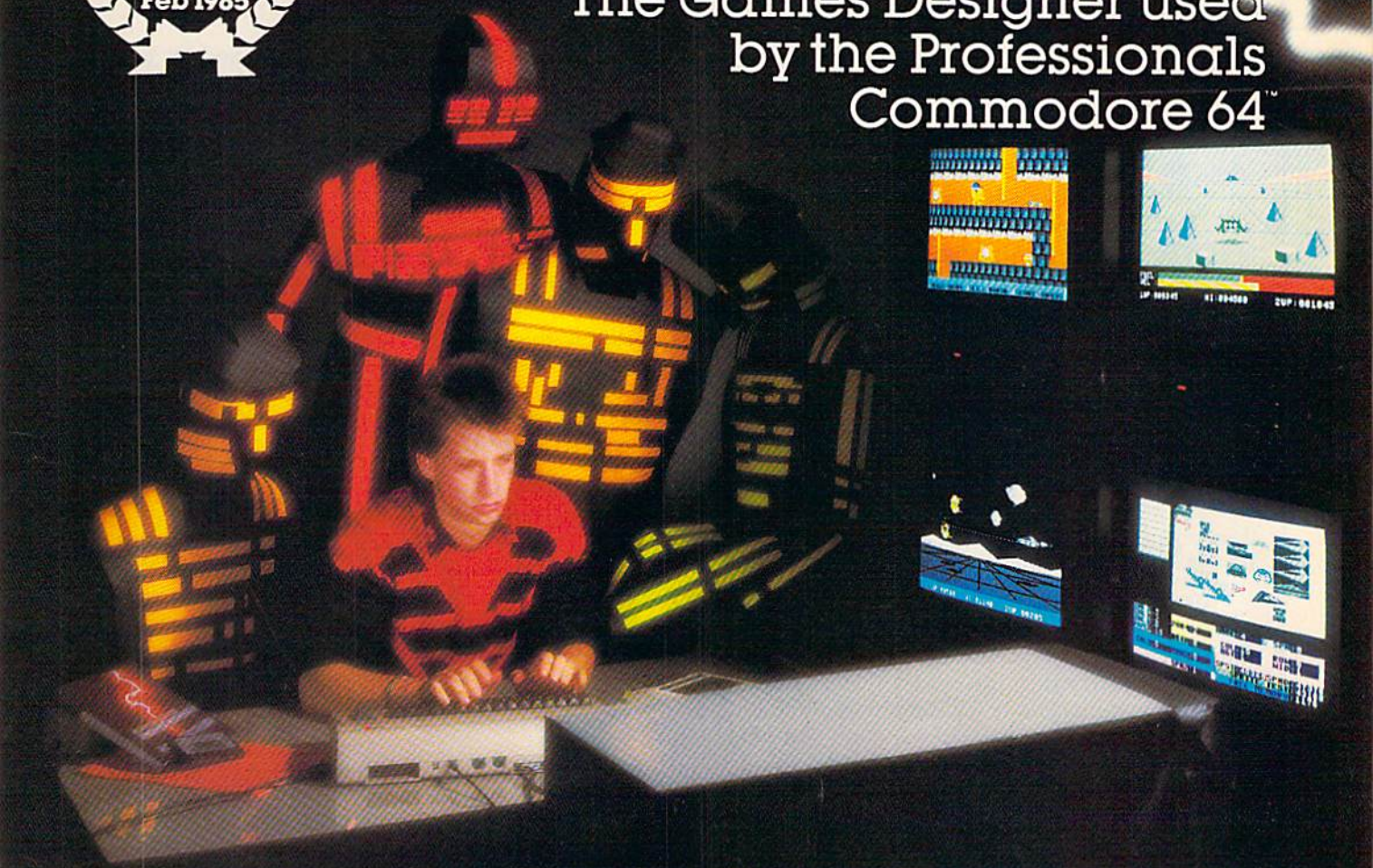
SPRCOLOR sets the multicolor registers shared by all sprites and the function RSPRCOLOR reads the sprite multicolor registers. The COLLISION statement transfers control to a specified line number when two sprites touch, or when a sprite touches part of the screen background. Your collision routine can see what

White Lightning

The Games Designer used by the Professionals

Commodore 64™

Program of the Year (Utility) L.E.T. C.T.A. Awards Feb 1985



Now, without any knowledge of machine code, you can write fast, smooth, professional, totally original games and market them without paying royalties.

Even if you have already mastered machine code, we believe that the time and problems saved by writing in White Lightning's **FORTH**-based high level language could revolutionise commercial games writing for years to come.

IDEAL IDEAL is an Interrupt Driven Extendible Animation sub-Language. Once you have mastered IDEAL's easy to learn set of over 100 commands and just a little FORTH, you will be ready to produce arcade-quality games even if you don't know machine code. Up to 255 software sprites, each with its own user-defined dimensions, can be moved around the screen (or memory), scrolled, spun, reflected, enlarged or inverted with amazing speed and smoothness. Operations are possible between screen windows, sprites and sprite windows. Software sprites can even stretch across several screens, so those difficult scrolling landscapes that form the basis of so many games are easy to achieve. White Lightning also adds PLOT, DRAW, POLY and CIRCLE as well as fully supporting the Commodore's own excellent hardware sprites and sound facilities. The IDEAL routines operate in hi-res or 4-color modes.

MULTI-TASKING Because White Lightning uses interrupts, you can effectively run two programs at once. This means, of course, that games like Space Invaders and Defender can be written without complex timing calculations. So while one program smoothly scrolls the landscape, the second animates the other characters. This is undoubtedly one of White Lightning's most powerful features.

MARKETING AND PORTABILITY Although White Lightning uses an integer FORTH as its host language, programs can be written in a combination of Commodore BASIC, FORTH, IDEAL and machine language. The final program will run independently of White Lightning and absolutely no marketing restrictions are imposed.

BASIC LIGHTNING In addition to the White Lightning program itself, the package also includes an extended BASIC. This BASIC adds more than 200 reserved words including all the IDEAL commands, procedures and a full set of structured programming commands. Up to five tasks can be run simultaneously. BASIC Lightning is also available separately.

SPRITE DESIGN White Lightning comes complete with a separate sprite designing program. Two libraries of sprites are included and up to 255 sprites can be designed with loading and saving facilities between sessions.

The package comes complete with two 100-page manuals and a free demonstration program is included to show off the potential of the system.

If your local dealer doesn't stock White Lightning, just send off this order form for our rapid despatch service. All checks in $US please.

Please send me _____ White Lightning System Packs at $49.95 each.
_____ Basic Lightning System Packs at $39.95 each.

NAME (PLEASE PRINT) _____

STREET _____

CITY/STATE _____ ZIP _____

☐ Check or Money Order ☐ Visa ☐ Mastercard

Please do not send Cash CARD # _____

Valid from: _____ To: _____

Signature _____

Mail Order Form to: Oasis Software. 377 Oyster Pt. Blvd.
Unit 15. South San Francisco. CA 94080.
Telephone: 415 - 588 - 1587/415 - 588 - 1595

Commodore 64™ is a registered trade mark of Commodore Electronics Ltd.

C.A. Residents add 6.5% Sales Tax.

Commodore LCD Lap Portable Update

Is there a lap portable computer in your future? Commodore's new LCD portable, introduced in prototype form at the January Consumer Electronics Show (see April GAZETTE), may hold special interest for Commodore 64 and 128 owners.

Originally scheduled for a midsummer entry, the portable is now being held back for release sometime after September, according to Frank Leonardi, Commodore's vice president for marketing. Despite rumors to the contrary, Leonardi confirmed that the portable has not been shelved.

The Commodore LCD has a super fast 80 × 16 liquid-crystal display, 32K RAM, 96K ROM, BASIC 3.6 (a slightly enhanced version of the Plus/4's BASIC), machine language monitor, and, among other features, eight built-in productivity programs (word processor, file manager, spreadsheet, address book, scheduler, calculator, memo pad, and terminal emulator). The portable, which weighs just five and a half pounds and fits in a briefcase, will sell for a reported $600.

During a recent visit to Commodore, the LCD's senior design engineer, Jeff Porter, took the GAZETTE on a tour of the finishing stages of the new machine. Beaming proudly, Porter rattled off a list of features as he showed off another prototype and then dropped in on members of the software design team who demonstrated final modifications:

• The fast LCD display results from a separate custom chip being used solely to handle the screen display. Hence, the 65C102 microprocessor doesn't have to write letters to the screen. "CRTs (cathode ray tubes) use a separate CRT controller chip," says Porter. "We've called this an LCD controller chip. The same principle applies."

• The portable is built to support Commodore 64 peripherals, such as the 1541 disk drive, as well as the new 1571 drive being sold for the 128, and a 3.5-inch Sony-style microdrive planned for possible release later in the year. All Commodore serial peripherals will be compatible.

• The word processor and spreadsheet are truly integrated, using windowing to let you work on either function at the same time via a split-screen display. The spreadsheet also supports independent scrolling in split-screen format, and, according to the spreadsheet engineer, will be faster at moving a thousand cells than *Lotus 1-2-3* on an IBM PC.

• Built-in utilities on the main menu allow copying from the internal RAM disk to an external disk drive, or for downloading over the modem or the RS-232 port.

• The internal 32K CMOS static RAM can be expanded to 64K using standard memory chips. Another 64K of RAM can be added externally.

• The BASIC 3.6 includes a command for talking to the built-in 300-baud modem, through an OPEN statement.

• The screen display has a virtual 25-line display (although only 16 lines show at a time). This allows the user to set up the terminal program to emulate a double-screen size, for example.

• The memo pad and calculator each pop up with a keystroke over any application being run, without destroying the program you're using. In addition, the calculator operates in any of several different modes. For instance, while working in BASIC, the user can call up the calculator and use the programmer's mode for hexadecimal, binary, and other computations.

• With some limitations, the BASIC 3.6 is downward compatible with the 128 BASIC 7.0. Although the portable cannot support all of the 128's features, such as color, it should allow the user to run BASIC programs from the 128 without crashing. Instructions the machine can't handle will be ignored by the portable's BASIC. The BASIC also supports graphic commands, such as high resolution boxes, lines, drawing, etc.—very similar to the Plus/4 capabilities.

• A new battery-powered thermal transfer printer will be available for the LCD portable. The three-pound, 11.7 × 2.5 × 4.5 inch printer works on AA batteries, and can print unidirectionally in Near Letter Quality (NLQ) mode at 22.5 characters per second (cps) and in draft mode at 45 cps. A test of the new printer produced an excellent NLQ image with all but the coarsest Bond paper.

• The portable, as seen this spring, did not support an external video display. But, Porter said, Commodore's design team for the portable has been considering using the same 80-column display chip found in the 128 to provide that capability. The chip might be housed in a cartridge which would plug into the expansion port, he added.

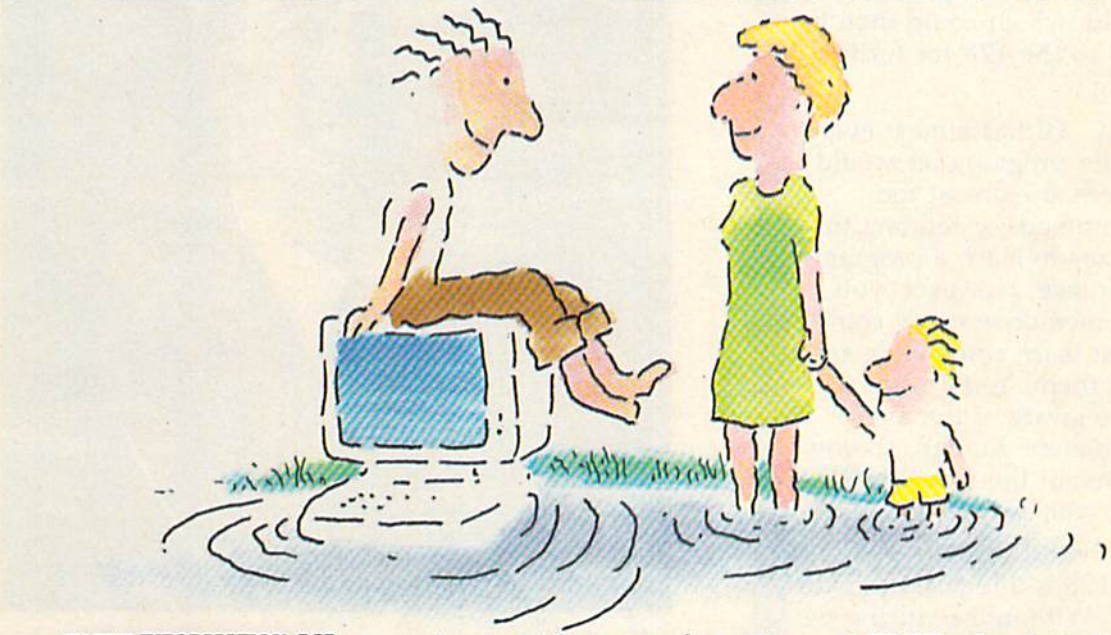
caused the collision with the function BUMP.

No longer are PEEKs, POKEs, or machine language necessary to read the game controllers. The function JOY returns the status of either joystick. POT returns the position of one of the four paddles, and PEN is used to read the X,Y coordinates of the light pen.

A few miscellaneous commands: SLEEP is used as a delay loop, pausing from 1 to 65535 seconds. GETKEY is like GET, but waits for a keystroke. GO64 exits to the 64 mode, but first asks ARE YOU SURE?, since anything in memory in the 128 mode will be lost.

The BASIC 3.6 in the Com-

GET YOUR FEET WET...



...IN THE INFORMATION AGE WITH THE DOW JONES NEWS/RETRIEVAL® MEMBERSHIP KIT. SAMPLE A CONTINUOUS STREAM OF KNOWLEDGE AT A PRICE YOU CAN AFFORD.

Now you and your whole family can experience the information age without getting in over your head.

For just $29.95, the new Dow Jones News/Retrieval Membership Kit leads you step-by-step into entertaining and informative data bases. With **five free hours** to sample and explore, you can find a fact, shop at home, get the scores, plan a trip, review a movie, choose a stock, or check world and business news. There's a lot more, too. All you need to get started is a computer and modem:

The Membership Kit is a big value that entitles you to:

- FREE password ($75 value)
- Easy, step-by-step User's Guide
- FIVE FREE HOURS of unrestricted usage to explore the magic of this comprehensive service
- FREE subscription to *Dowline*, the magazine of Dow Jones News/Retrieval
- A special introductory offer!

Get your feet wet in the information age with the Dow Jones News/Retrieval Membership Kit. At $29.95, you'll enjoy the dip without getting soaked. Available at your local computer retailer, or call Dow Jones at:

1-800-257-5114
In New Jersey, Canada, Hawaii and Alaska
1-609-452-1511

"Toss away any preconception that Dow Jones News/Retrieval is a stuffy, one dimensional data base service designed only for an elite corps of stock analysts and Wall Street wizards. Far from it—Dow Jones News/Retrieval also provides entertaining movie reviews, current weather and sports reports, convenient electronic shopping and inexpensive electronic mail. . .Dow Jones News/Retrieval is informative, entertaining and well worth the money."
-Brad Baldwin, *InfoWorld* Magazine

DOW JONES NEWS/RETRIEVAL®

Copyright © 1984 Dow Jones and Company, Inc. All Rights Reserved. Dow Jones News/Retrieval® is a registered trademark of Dow Jones and Company, Inc.

modore LCD lap portable can run BASIC 7.0 programs as long as the programs shy away from PEEKs and POKEs (which shouldn't be needed very much with such a powerful BASIC). Although the LCD lacks sprites and the SID chip, its BASIC is programmed to merely ignore the BASIC 7.0 commands it can't execute, instead of crashing with a SYNTAX ERROR. This is indicative of a possible Commodore plan to pair these machines. The LCD portable would be used to acquire data in the field, which could then be uploaded to the 128 for further processing.

BASIC 7.0 has almost every command a programmer would need. There are almost too many commands, extending the time it takes to learn a programming language. However, you need not memorize every command, just learn commands as you need them. You'll want to at least be aware of the available commands, though, so you won't reinvent the wheel by POKEing your way to sound or graphics.

The 128 is a logical upgrade of the 64. Without sacrificing 64 compatibility, the 128 answers almost anyone's wish list. BASIC 7.0 gives programmers freedom to program without POKEs or cumbersome machine language routines. The 80-column display, 2 MHz microprocessor, 128K of memory (theoretically expandable to a megabyte), CP/M Plus, and fast double-sided disk drive make the 128 a capable business machine, competitive with the much more expensive IBM and Apple computers. As usual, though, we'll still have to wait for software to be written that takes advantage of these features. Although you can use existing 64 and CP/M programs, it looks like you'll have to write your own 128 mode programs for a while.

An Interview With
Paul Goheen
Commodore's Director of Software

Selby Bateman, Features Editor

Paul Goheen, who directs Commodore's software division, can be considered one of the genuine veterans in the post–Jack Tramiel Commodore environment. He joined Commodore during the latter part of 1980, shortly after the launch of the 8032 computer and before the introduction of the VIC-20. Previously a programmer, systems analyst, and consultant in the mainframe and minicomputer arenas, Goheen came to Commodore as a software product manager at a time when Commodore's U.S. computer operations included only about 20 people. In the past few years, he has seen the amazing growth and the many changes which have occurred at the company and in the microcomputer industry in general.

When COMPUTE!'s GAZETTE *recently spoke with Goheen, Commodore was working full tilt to launch the 128 into the retail market by May and June. Also underway was the surprising lap portable computer now planned for an early fall release. Both the 128 and the portable were introduced at the January Consumer Electronics Show (CES). In the wings is the Amiga Lorraine computer, an eagerly awaited powerful and versatile 16/32-bit machine which Commodore has kept under wraps since purchasing the Amiga company last summer. The Amiga is scheduled for a midsummer entrance.*

Why settle for less when you can have Mo?

Mitey Mo turns your Commodore 64 into a telecommunications giant. It's the best-performing modem with upload/download.

Mitey Mo is being hailed as "the best price/performance communications package available." Its software has received the endorsement of the U.S. Commodore Users Group, which gives a money-back guarantee to members. It is truly the industry standard, and no wonder. It's the most user-friendly modem you can buy—it will take you online faster and easier than anything else.

Mitey Mo opens up a world of practical and exciting uses for your C-64. It lets you send and receive electronic mail, link up with community bulletin boards, play computer games with people in distant places, tap into library resources, and much more. All at your convenience.

Until Mitey Mo, Commodore's 1650 Automodem was the obvious choice when you went looking for a modem for your computer. Like Mitey Mo, it has "auto answer"—it receives data while unattended. And both modems are "auto dialers"—you dial right on the computer's keyboard. But that's about where the similarity ends.

Mitey Mo can dial up to 9 numbers sequentially. But suppose you dial a number and find it's busy. Mitey Mo has "auto redial"—it hangs up and redials immediately until it gets through. With the other modem you have to redial each time—and somebody with auto redialing can slip in ahead of you.

Mitey Mo is menu driven. It lists the things you can do on the screen. Select a number and you're on your way. Since Automodem isn't menu driven, you'll be hunting through the manual a lot.

With Mitey Mo, your computer's function keys are programmable—you can save yourself plenty of keystrokes. Not so with the other modem. And only Mitey Mo lets you store data to review or print it later.

Mitey Mo has just one switch, the Smart 64 software does the rest. With the other modem you'll have to remember to check three switches, otherwise you may be answering when you mean to be originating.

Mitey Mo is half the size of the other modem. The very latest technology allows miniaturization and increased reliability, as well. Mitey Mo is so reliable, we gave it a full three-year warranty. The other modem gives 90 days, then you're on your own.

Not only will you find Mitey Mo mighty useful, you'll find it mighty reasonably priced. When you buy it, you'll get $15 of CompuServe access time free, as well. See your dealer or call us directly to order your Mitey Mo.

MODEM FEATURES	MITEY MO	COMMODORE AUTOMODEM
Auto Dial/Answer	YES	YES
Auto Redial	YES	NO
Smart 64 Software	YES	NO
Function Keys Programmable	YES	NO
Upload/Download Text & X-Modem	YES	NO
VT-52/VT-100 Emulation	YES	NO
Menu Driven	YES	NO
28K Software Buffer	YES	NO
Easy-to-Use Manual	YES	NO
Bell 103 Compatible	YES	YES
Multiple Baud Rates	YES	YES
Cable Included	YES	YES
Single Switch Operation	YES	NO
Warranty	3 years	90 days

Some mighty interesting features—ours and theirs. Yours to decide.

CDI

Computer Devices Int'l
1345-A2 Doolittle Drive
San Leandro, CA 94577
(415) 633-1899

GAZETTE: As Commodore introduces the new 128 computer, what plans are there for the future of the 64, the Plus/4, and the 16?

Goheen: The 128, our acquisition of Amiga, our PC product outside of the U.S., and other products we have on the drawing board are indications that we have expertise outside of the low-end marketplace. The 128 I honestly see as a bridge machine, that is, an introduction, or a taste, of our ability to compete outside of the current bandwidth in which we do business.

What we are doing is preparing for the future, and not the future in terms of moving from one bandwidth to another by discontinuing where we were. We're moving to the future by expanding our marketplaces into other arenas, and at the same time keeping our previous market share in the lower bandwidth. Hardware at Commodore is something that we've exhibited that we do well. And we have the vertical integration and the manufacturing and engineering abilities to put together products in a short period of time and to respond to market changes.

The 64, the Plus/4, and the 16 on an international basis and on a U.S. basis complement each other in terms of sales. We will continue to promote and push those products up to the point where business dictates we look toward other arenas. The 128 will be promoted right along with them. There will be different price points; there will be different opportunities. We can pitch the 128 from two directions that we can't with the 64. The 128 is going to be promoted from a [mass merchandising] point of view, trading on the 64 compatibility. And, "Oh by the way, here are these other expanded areas of the machine that you can grow into on a professional basis." From the specialty store end of the marketplace, the 128 will be vended primarily from its 80-column professional aspects and, "Oh by the way, it runs all these great 64 consumer type products as well."

So, we have the ability with this machine to begin the cross-pollination into other marketplaces and to other forms of distribution. And the Amiga will be the next step in that same direction, at the same time keeping the other end of the business alive.

GAZETTE: So, Commodore doesn't necessarily drop the 64, the Plus/4, and the 16 when the Amiga comes out and when the 128 is selling, as long as there is a market for them.

Goheen: That's entirely correct. We have no plans of discontinuing anything just for the sake of discontinuing it. Our introduction of product and our discontinuance of product is based solely on prudent business decisions. You can't *not* look at the international ramifications of this because we have situations where a product is selling to a certain level in the United States, and it may sell at a much higher level in other countries. So the United States is really to us one facet of an international, or global, business.

GAZETTE: Does Commodore have any plan to make a programmer's reference guide for the Plus/4 and the 16 such as there has been for the 64?

Goheen: There are plans, and actually there is quite an amount of effort that has already been completed on that very subject. The final distribution [of the reference guide]...will follow as a function of where the volume of product is sold.

GAZETTE: Is a programmer's reference guide planned for the 128?

Goheen: That will be likely as well. We plan to be in the book business as much as makes sense from a technical reference manual point of view. We have very good relations with major publishers who have promoted our products in the past. We are also, as a separate topic, working on joint ventures with other companies to take software products and join them with a textbook, and pair the two together, and then work with these publishers in the educational community.

GAZETTE: Will you be working at Commodore and among third party people on developing new CP/M programs for the 128 or will you depend on the vast library of CP/M that is currently available?

Goheen: Our initial blush of the CP/M side of the machine, by design, was to take advantage of the software that is currently on the shelf. Previous to CES, I had already had meetings with all the major CP/M providers. In all cases, people expressed interest. In some cases it was mild interest, and in some cases people were terribly excited. And that really is a reflection of the individual company's interest in keeping that end of their business alive.

From an initial distribution point of view, [Thorn/EMI's] *Perfect* series will be provided from Commodore to address the standard horizontal product areas on the CP/M side of the machine (*Perfect Writer, Perfect Calc, Perfect Filer,* etc.).

With the 128, we are finishing a product that will allow you, via menu, to reprogram the controller inside the [1571] disk drive and make the drive think it is another type of disk drive. And you will be able to take off-the-rack software—Kaypro, Osborne, and some of the other formats that are out there—and put it in the drive, and the drive will read it. We've tried to build enough of that into the machine so it can take advantage of the additional products that are out there.

Without naming names, we have a large library of [third-party CP/M] products here already. And a large degree of them have worked right off the shelf. We just put them in and fire them up, and they go through the configuration, and they operate in totality.

GAZETTE: So there is CP/M software available that you can use with the 1571?

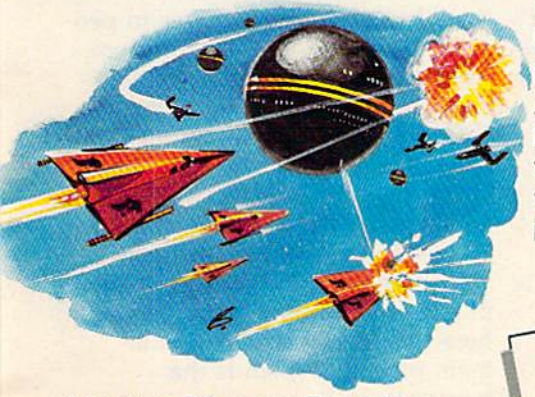
Goheen: That's correct. When we package our product, some of it will be done in a 1541 format so it will be available to the least common denominator Commodore user out there because we have designed the CP/M so it will work with the 1541. Obviously, it works better with the 1571, but it will function and work, and to not exclude any potential customers, we have taken pains to format things a certain way.

Get more out of your Commodore with

COMPUTE!'s GAZETTE

For Owners And Users Of **Commodore VIC-20**™ And **64**™ Personal Computers

More fun



Martian Prisoner, The Viper, Skydiver, Snake Escape, Demon Star, Cyclon Zap, and Oil Tycoon are just a few of the ready-to-run games you'll find exclusively in *COMPUTE!'s Gazette* each month. Just type in the programs and watch your screen explode with colorful new computer game excitement.

More challenge

Ready to tackle more advanced projects? In *COMPUTE's! Gazette*, you'll learn how to use tape and disk files, how to program the function keys, writing transportable BASIC, how to make custom graphics characters, new ways to enliven programs with sound, one-touch commands for the 64, how to use machine language, speeding up the VIC-20—and much more!

Children will learn and develop new skills with States & Capitals Tutor, Wordmatch, Munchmath, Wordspell, Connect the Dots, Aardvark Attack, and Alfabug. Computing for Kids, a regular monthly feature, will uncover new ways to involve your children in computing.

More programs

Programs to help you balance your checkbook, store your addresses, keep tax records, manage your personal business. You can create your own programs and games, improve your word processing, spreadsheets, and data base management, load and run faster with 64 Searcher, VIC/64 Program Lifesaver,

speedscript
With a true word processor, you type everything in first, then print the whole thing out. Before you print, you can make as many changes as you want. A good word processor lets you change any line, swap paragraphs, and manipulate your text in numerous other ways. You can buy such a word processing program for your VIC or 64 for $40 to more than $100, depending on the features.

Quickfind, Word Hunt, Disk Menu, VIC Timepiece, The Automatic Proofreader and more.

$ $ $ $ $ $ $ $ $ $ $ $

More buying guidance

You'll profit from comprehensive reviews of everything from data-quality cassette tapes to software to graphics plotters and modems. Virtually anything that's compatible with your Commodore is reported on in *COMPUTE!'s Gazette*. With this kind of expert help, every computer purchase you make can be the right one!

Order now

All you do is mail the postpaid card bound into this issue. But don't delay! Subscribe now to start receiving every issue of *COMPUTE!'s Gazette*.

For Faster Service
Call Toll-Free
1-800-334-0868

GAZETTE: So if a person gets a 128 and has a 1541 and doesn't want to get a 1571, he or she will be able to use some of the CP/M software?

Goheen: Right. And there's the upgrade path, too; taking the current 64 owner and having them look at buying a second machine or a replacement, but maybe not wanting to sign off on the additional peripheral initially. They can step up as well.

GAZETTE: How about program translation from the 64 to the 128? Among third party software developers and Commodore itself, is that much of a problem?

Goheen: Commodore 64 products that are on the shelf now are 100 percent compatible with the machine on the 64 side. They will run straight away. From an upgrade path to effectively run right on what I call the middle of the machine—the 128 side of the machine—the BASIC in the 128 is greatly enhanced even over the BASIC we had in the Plus/4. And it is a superset, so all of the BASIC is compatible.

Now that's a dangerous statement, so let me rephrase it. In BASIC, there are two commands—PEEK and POKE—which are throwbacks to machine language. You know, deposit-this-at-this-address type of command. Technically speaking, PEEK and POKE are not considered part of BASIC. But nonetheless, they are quite heavily utilized in some programs [for the 64]. In the programs that do not care to use PEEK and POKE, the BASIC will run straight away. Programs that use those PEEKS and POKEs that look at a specific address; what was at that address in the 64 is obviously not going to be in the same place in the 128. That is the incompatibility from a BASIC point of view.

In the 64, to really get the utmost out of the product in terms of the graphics and sound, one had to use PEEKs and POKEs a lot. You could not be just your average run-of-the-mill weekend programmer to get the utmost out of the box. From that point of view, we produced two products called *Super Expander* and *Simons' BASIC*. There have been other products from other vendors that provide or extend the BASIC to give you commands. Now realizing the awareness and the utilization of those features of the machine in the Plus/4, we extended the BASIC and added commands such as CIRCLE, PAINT, DRAW, LINE, and so on.

In the 128, we've added to that even further, so that in the 128 BASIC and in BASICs after the 128—just looking down the pike—the utilization of the PEEK and POKE will almost become nonexistent because the things that required you to do that before have now been augmented in the BASIC in ROM so one is really not required to use that. So, from a BASIC conversion point of view, if I have a product that required a lot of PEEKs and POKEs on the 64 to make it work, I can probably very simply replace most of those just by using the commands in 128 BASIC.

So the compatibility issue is there, yes, but there are certain caveats one must be aware of. From a developer's point of view, it's a cakewalk. From the weekend programmer's point of view, it will be a little harder, but still very easy.

Now, from an assembler point of view, a machine language point of view, the 128 is a Kernalized machine as was the 64, and the Kernals are very similar, such that you can use most of the atoms you had in your machine language code, and with a reassembly, you can make them work inside the 128.

GAZETTE: You and others at Commodore have spoken of the new approach which the company is now taking in its business relations with dealers, consumers, and the press. Could you briefly characterize the change?

Goheen: Mr. [Jack] Tramiel was an entrepreneur's entrepreneur. The man was an absolute dynamo in terms of energy and enthusiasm, and is someone that I myself honestly am quite glad to say that I had the opportunity to know. He has taken Commodore from what it was up to a very large company.

Marshall Smith (current president of Commodore) is a businessman's businessman. He is a very polished professional individual, and he strategizes, implements plans, follows the plans, takes input, modifies the plan if it's required. He is the gentleman we need to take us from where we are to the next plateau of an even bigger company.

Companies like Commodore, companies like Apple, like IBM—we've probably started to get to the point where we've sold all the computers we're going to sell to the hobbyists and weekend hackers and enthusiasts. Now let's find responsible reasons to sell to people who don't fit into those categories. Let's find some real reasons to continue to sell these machines to people who have a real use for them. And let's try to go forth as a business and not merely enjoy the fruits of selling into an enthusiasts' market.

We *are* in the software business, no ifs, ands, or buts about it. We are in the software business with both feet, and our hearts and minds are in it, and we're primarily here to support the sale of our main product, which is the hardware.

Our [software] product line several months ago was up over 100 titles. Now, in the largest retail outlets, at most there's approximately 350 titles at any store. Out of 350 titles, a major company will at most get 20 of those titles. From a prudent business point of view it makes little to absolutely no sense to have a product line of up over 100 titles. You'll end up eating them. I am shrinking the product line, bringing it into the order it should be.

So my first line of defense again is to insure that the software matches the hardware and the hardware receives a successful launch and really starts to kick off. Past that, we intend to engender as much public support for the machine as we can and anyone who thinks that they would like to develop software for it—no matter even if they're just a little garage shop operation— we'll be glad to try to help them as we have time and resources.

YOUR COMMODORE 64™ CAN NOW USE STANDARD APPLE™ II+ HARDWARE AND SOFTWARE

WITH THIS

At Mimic we believe that you and your computer should dictate the choices of hardware and software you can use.

The Spartan™ was developed to allow you to choose the hardware and software that best suits your needs.

Our goal in designing the Spartan™ was simple. To take what you already have and give you more.

Mimic Systems is proud to give you the Spartan™ The Apple™ II+ emulator for the Commodore 64™

Spartan™ Suggested Retail Prices:

The Spartan™ (includes BUSS, CPU, and DOS cards) $599.00
BUSS card $299.00
CPU card (requires BUSS card) $199.00
DOS card (requires BUSS and CPU card) $199.00

(All prices in U.S. Funds. Freight not included.)
American Express, Visa and MasterCard accepted.

Commodore 64 and Commodore logo are trademarks of Commodore Electronics Ltd. and or Commodore Business Machines, Inc. Apple® II+ is a trademark of Apple Computer, Inc. Spartan™ is a trademark of Mimic Systems Inc., and has no association with Commodore Electronics or Apple Computer, Inc. The Spartan is manufactured by Mimic Systems Inc. under license granted by ATG Electronics Inc. of Victoria, B.C., Canada.

MIMIC

FOR INFORMATION WRITE:

MIMIC SYSTEMS INC.
1112 FORT ST., FL. 6J
VICTORIA, B.C.
CANADA V8V 4V2

To Order Call:
1-800-MODULAR
(663-8527)

GAZETTE: Could you tell us about the service centers for consumers that Commodore has announced—the RCA centers, the Sears stores, the other outlets?

Goheen: The service aspect is being upgraded. We're adding professional service companies to our list. The 128 product, for the first time, will be packaged with several brochures, one of which will point to software products coming from different vendors. So other people's software will be advertised in the box for the first time. There will be a service center brochure in there. There will be a little thing that says "Read Me First." It will say, if you're having the following problems, do the following things. And then if that doesn't pan out, here's some places to get on the horn with. There will be a number of items packed in the 128 that we feel will do one thing: reinforce, on the part of the end user, a positive purchase, make them feel comfortable that they spent their money right.

GAZETTE: If a person has a problem, then he or she can go into one of these service centers instead of having to ship the computer off?

Goheen: Right. Of course, we still have substantial warranties, replacement warranties right across the counter, so if they buy it at a local retail outlet and find something defective or not to their liking, [they get] a new one right across the counter, no questions asked for a length of time. Outside of that window, then, they can utilize the other service things that we have made available to them as well.

GAZETTE: Atari's ST line of computers has created a stir, but many people are also quite interested in Commodore's Amiga. What can you say about the Amiga Lorraine computer at this point?

Goheen: As we stated at CES, the Amiga machine from Commodore will enjoy a mid-1985 launch. I think someone commented—making a play on the cliche—that like a fine wine, we will sell no machine before its time. This is not a hurry-up situation for us because we're quite confident that our 128 machine, against announcements of other companies of their 128 products, is a superior product from a hardware point of view. The Amiga product that we will put on the street will be considerably superior to other products that are being marketed in that same bandwidth.

Things are progressing on schedule. We're being confident, and we're walking right down the path as was designed. So, in terms of launch, mid-85. In terms of what the product will be—it will be quite honestly a yardstick by which all other machines of that type are measured.

GAZETTE: As you look at Commodore software and hardware plans, what's your feeling about the needs of the consumer?

Goheen: We have a crusade here that almost borders on religious fervor to really look at ourselves as people and say, what reason would I have realistically to spend this money and buy this machine, and take it home? What, really, am I going to do with it?

One of the activities we are getting behind substantially—and what I mean by substantially is that we are putting our money where our mouth is here in terms of hardware manufacturing—we have just put a new modem into the marketplace. It's just a little more updated version of our current modem. You'll begin to see that on a marketplace to where it comes out at a price that goes beyond the word competitive. A little later in the year, you'll see a 300 and 1200 baud version....

GAZETTE: The 1670?

Goheen: The 1670. We will be the first company that will provide a truly DC, Hayes-like, very professional 1200-baud "smartmodem." And we will ultimately break the $100 price barrier on that.

GAZETTE: So, you're putting an increased emphasis on telecommunications as a central use for a computer?

Goheen: Yes. I actually think the word *increased* is probably not strong enough. We are highly motivated from the point of view that we have made the manufacturing commitment to build the necessary volumes of hardware products to support this activity.

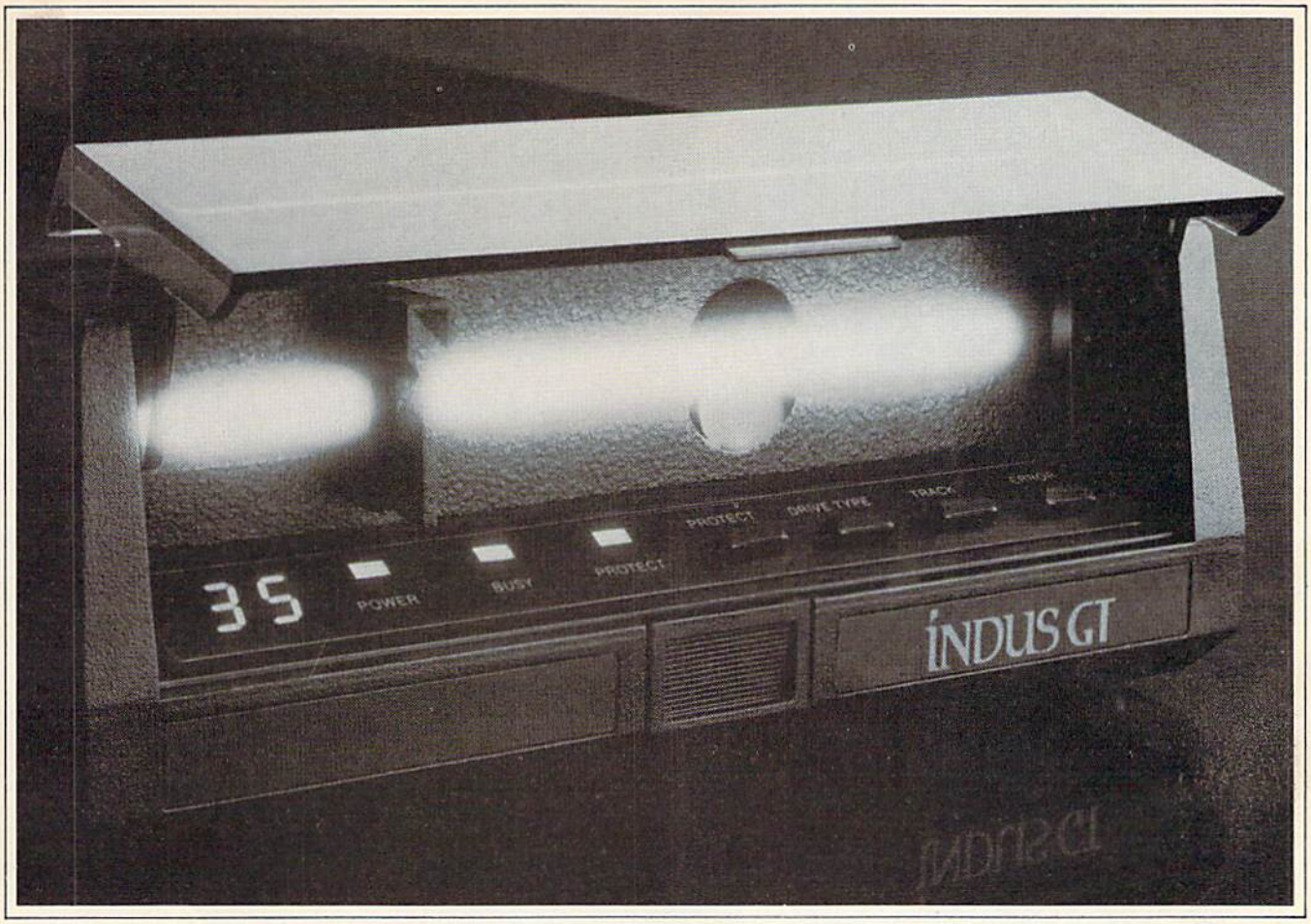
GAZETTE: We know Commodore has been working with Tele-Learning in its Electronic University program as well as several other companies. How are these services to be coordinated?

Goheen: Right now, we have relationships with CompuServe, Dow Jones, The Source. We provide snap packs for the different people—Delphi, Playnet, TeleLearning people. We're looking into getting these specialized databases aligned with one of the major services. And as a sidelight, if we find other people not able to provide the necessary level of service we feel is adequate to promote these specific learning activities online, we are in a position to promote and create a major service on our own. That's something we're looking at as an opportunity as well. That is not to supplant the other people. We are in a position to help promote all of the people on an equal basis at this point and just to generally try to raise the awareness of what telecommunications can mean for you at home on a daily basis.

GAZETTE: We've heard that Commodore's 1660 modem may sell for as low as 30 dollars. A price like that would tie in very well with what you spoke of earlier on the 1670's low price as a 300–1200 bps device.

Goheen: I don't know what the initial pricing will be on the 1670. But the specifics of our 1600 modem [the VICmodem], which is a direct connect modem, right now is enjoying retails in the 30 dollar bandwidth. The 1650 modem is right now enjoying retails of up in the high 40 dollars, and I look for those probably to change with time. And I think initially the 1670 will be considerably more than that just because of the sheer technology in the box.

We as a company normally don't like to shoot our mouth off and not come across. But I do believe you will enjoy some things later in the year that will put that 1670 down in price to where we're certainly going to put a hurt on people in the modem business.



What you get if you cross a Commodore 64 with a Ferrari.

You get the incredible Indus GT™ disk drive.

You get brains. You get beauty. But, that's not all you get.

You get a disk drive that can handle 100% of Commodore's software. Up to 400% faster.

You get the disk drive with the best service record around. With a one year warranty on parts and labor to prove it.

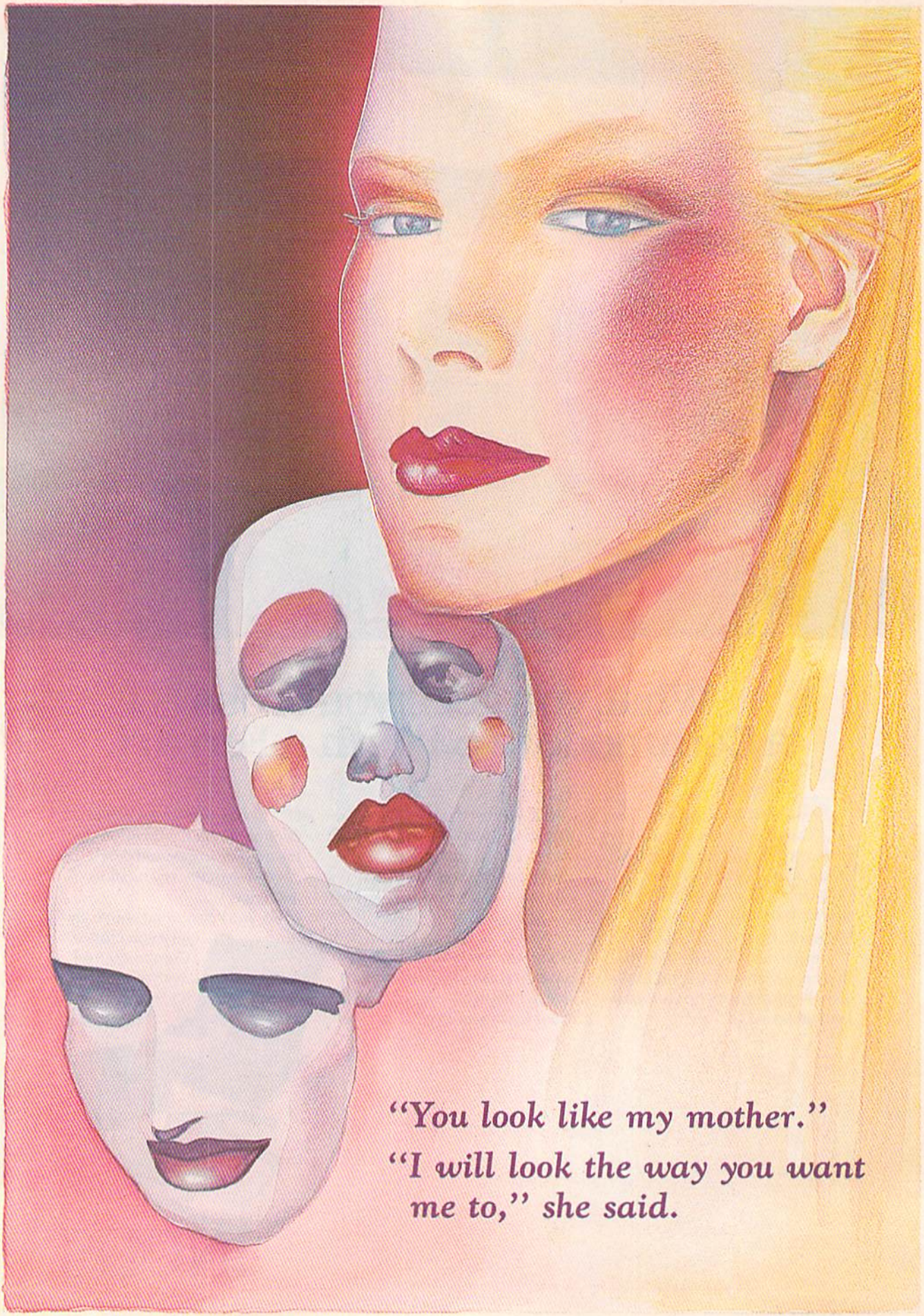
And, you get the only disk drive that comes with free software. Word processing. Spreadsheet. Database manager. Plus, a carrying case that doubles as an 80 disk storage file.

Most of all, you get luxury. From the sleek lines of its soundproofed chassis to the responsive AccuTouch™ controls at the Indus CommandPost.™ From the LED display that keeps you in control of your Commodore to the air-piston operated dust cover that protects your disks and drive.

So, you know what you really get if you cross a Commodore 64 with a Ferrari? You get the best.

INDUS™

© Indus Systems, 9304 Deering Avenue, Chatsworth, CA 91311 (818) 882-9600. The Indus GT is a product of Indus Systems. Commodore is a registered trademark of Commodore Business Machines, Inc. Ferrari is a registered trademark of Ferrari North America, Inc.



"You look like my mother."

"I will look the way you want me to," she said.

How Writers See Games

Selby Bateman, Features Editor

Electronic novels, interactive fiction, all-text adventure games, living literature. Whatever the names, the landscape of this brand of computer game is changing. New writers and seasoned programmers are together stretching its boundaries with refreshing approaches to plot, writing style, and game interaction. The competition is intensifying.

Imagine a wheel—a colossal, rotating wheel into which is drawn all of the images of a culture: every experience, every event, every object, every person's mind and body. This wheel is a vortex which you must try to manipulate and understand.

"I hope this doesn't sound too fancy," says Robert Pinsky, breaking into his own explanation with a slightly self-conscious laugh.

"It involves the idea of striving for control and mastery, and the world being so complicated that every time you strive you're creating another system that becomes part of this big whirling thing which is everything everybody's ever known or thought or dreamed up to amuse themselves. Jokes and technologies and mythologies and religions and roads and....just everything."

Pinsky pauses again, as if considering the magnitude of such a wheel for the first time. He's describing the underlying concept of a computer game he created—*Mindwheel*, an all-text adventure for the Commodore 64, Apple, Atari, IBM, and IBM-compatible computers. The game represents as unusual a combination of complexities as does Pinsky himself.

You play the game by immersing yourself alternately within the minds of four deceased people: a peace activist rock star, a monstrous dictator, a heroic poet, and a gifted scientist. All of those minds are linked along neural pathways to a common matrix leading to the Wheel and a mysterious Cave Master. You can directly address characters, ask them questions, and travel from mind to mind. The humor is sophisticated, and yet surprisingly accessible; off-screen characters move about at random; and Pinsky's writing presents a rich atmosphere within the game world itself.

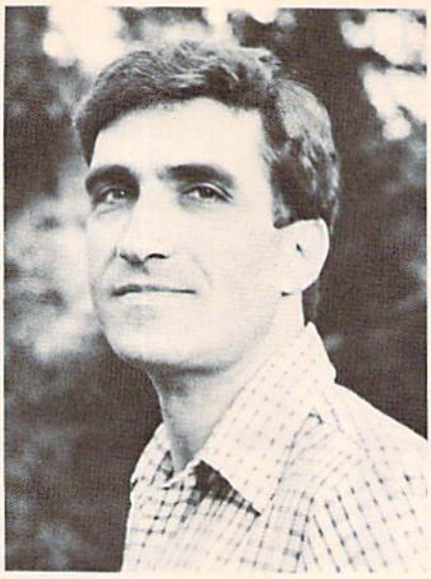
How did this university academic, a magazine poetry editor, scholar, and award-winning poet, get involved with the development of a commercial computer game? Why would a software company, Synapse, seek out Pinsky, someone who had never even played a text adventure game until after he created the concept for

Mindwheel? And how did this nonprogrammer bring his own version of the Wheel to the arena of a computer game?

To understand the answers to those questions is to appreciate how interactive fiction is evolving. Gone forever are the days when an all-text adventure game with simple two-word, noun-verb command combinations and a series of arbitrary puzzles could impress computer game fans. "Kill dragon" and "take sword" have been replaced with more sophisticated programs capable of taking full sentences and separating the nouns, verbs, adjectives, adverbs, and direct and indirect objects.

Most computer adventure games are based on a story. You may be a detective investigating a crime, or a heroic knight in search of a magical unicorn. You have the freedom to make decisions—moving north or south, acting friendly or unfriendly to characters you meet. But obstacles and puzzles hinder your progress. You may need a key to pass through a door, a boat to cross the river, or a map to find your way. By persisting, you discover the answers one at a time to advance to the next level of play. Ultimately, the solution to the game is the solution to the final puzzle.

While an increasing number of these games use graphic images to complement the onscreen text, the oldest computerized interactive fiction is based on text alone. Without having to use valuable and limited computer memory to draw the graphics, the all-text adventures have room for larger vocabularies, more descriptions of scenes, and more powerful *parsers*—the programming routines which break down your English-language commands into numbers the computer can manipulate.



Robert Pinsky, poet, professor, editor, and author of Mindwheel, *a new all-text adventure game for the Commodore 64.*

But more than a year ago, Robert Pinsky knew virtually nothing about these distinctions as he walked the halls of the University of California at Berkeley. The dark-haired poet and professor was more likely to drop the names of Ezra Pound or the Bloomsbury group of writers in his conversations than to mention a Commodore 64 computer or the fortunes of IBM versus Apple. As head of the university's creative writing program and as the poetry editor for *The New Republic* magazine, Pinsky was immersed in writing and teaching far removed from the bits and bytes of computing. His students may have been staying awake past midnight playing *ZORK*, but Pinsky was only marginally aware of the growing computer adventure game field.

Enter Synapse, a computer software company looking for a very special type of writer to work on a new series of interactive games it would call *electronic novels*. These adventures would be packaged as hardback books with a disk in the back. In order to play the game, users would have to learn information from the book.

"What we wanted was to expand the imaginative realm in text adventures beyond what it had been," says Synapse's Richard Sanford. "Up to now we've been looking through blinders, through a very narrow window in text adventures. We wanted to deal with writers whose main stock and trade is to expand the narrow window on reality and to be able to give us a rich imaginative experience."

So the company looked for writers who knew little or nothing about computer games, whose ideas would not reflect the biases which might creep into the mind of someone familiar with *ZORK*, its cohorts of popular adventures, and the highly respected Infocom, Inc., which created and marketed the most successful of those games.

Tell us a story, Synapse said to Pinsky. Then together we'll build a game.

So Pinsky sat in his office and thought about the Wheel, a concept he had first used in a poem called "The Figured Wheel." That was published in his 1984 book of poetry, *History of my Heart*, which early in 1985 won the prestigious William Carlos Williams Award from the Poetry Society of America. As he developed the spiraling concept of *Mindwheel*, Pinsky knew little or nothing of Infocom, the cryptic acronyms ZIL and BTZ, or two programmers, William Mataga and Steve Hales.

What he would later discover is what many hardened game players already know: that Infocom, Inc., of Cambridge, Massachusetts, has set the standard for quality in the field of all-text adventures. Its plots have been the best, its prose the classiest, its parsers the most powerful, and its proprietary programming language—ZIL (*ZORK* Interactive Language)—the most accomplished. Synapse, with its idea for *electronic novels*, was approaching Pinsky

CLOSE ENCOUNTERS OF THE FANTASY KIND

QUESTRON.™ *A role-playing game so spell-binding, it suspends reality and conjures up an enchanted world whose only hope against the forces of evil is you.*

GEMSTONE WARRIOR.™ *A lightning-fast action strategy game that will leave you breathless with excitement as it takes you through the labyrinths of the Netherworld on a noble quest.*

Open them up and step through the gateway to your fantasies come true.
At your local computer/software or game store today.

QUESTRON™ is available on 48K diskette for APPLE® II with Applesoft ROM, Apple II+, IIe, and IIc ($49.95). On 40K diskette for ATARI® home computers ($49.95). On 64K diskette for COMMODORE 64™ ($39.95).

GEMSTONE WARRIOR™ is available on 48K diskette for APPLE® II with Applesoft ROM, Apple II+, IIe, and IIc ($34.95). Also on 64K diskette for COMMODORE 64™ ($34.95).

© 1985 by **STRATEGIC SIMULATIONS, INC.** All rights reserved.

If there are no convenient stores near you, VISA & M/C holders can order direct by calling **800-227-1617, ext. 335** (toll free). In California, 800-772-3545, ext. 335. Please specify computer format and add $2.00 for shipping and handling.

To order by mail, send your check to: STRATEGIC SIMULATIONS INC, 883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043. (California residents, add 7% sales tax.) All our games carry a "14-day satisfaction or your money back" guarantee.

WRITE FOR A FREE COLOR CATALOG OF ALL OUR GAMES.

APPLE, ATARI and COMMODORE 64 are trademarks of Apple Computer, Inc., Atari, Inc., and Commodore Electronics, Ltd., respectively.

and other writers with a plan to compete against Infocom in the same market.

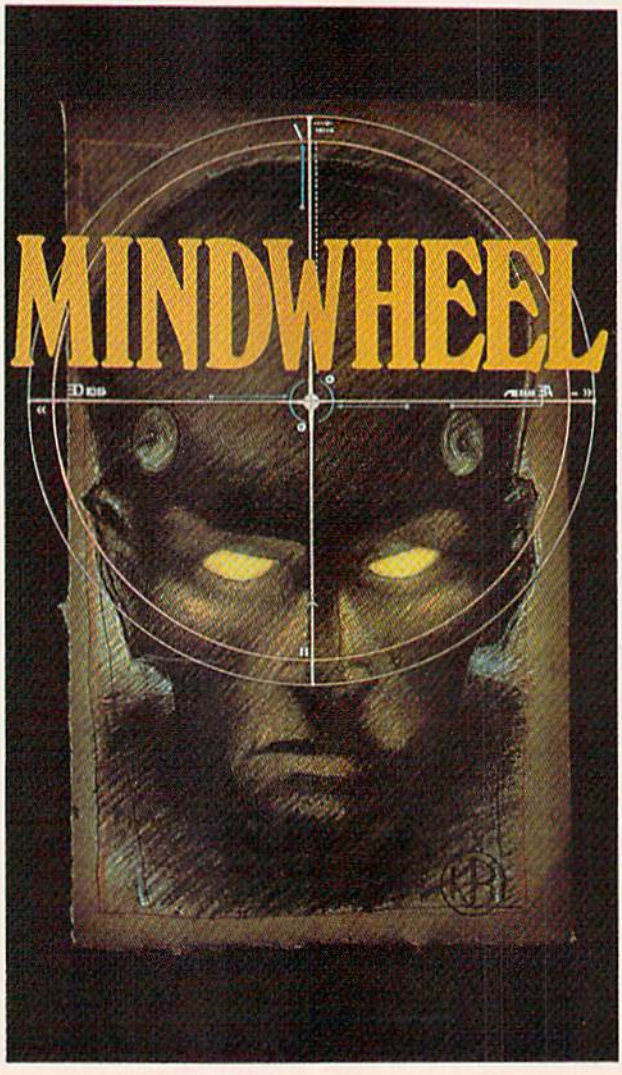
"We were very conscious of what Infocom was up to," says William Mataga, an independent programmer who later worked with Pinsky and programmer Steve Hales on *Mindwheel*. "We had as a goal that we had to do everything that Infocom does, plus one." As Pinsky created a concept, Mataga was independently putting the finishing touches on the underlying programming language BTZ, which appropriately stands for—Better Than *ZORK*.

Many other companies have attempted—and still try—for a slice of the interactive fiction market. None has had as much critical and popular success with all-text adventures as Infocom. Software companies like Bantam and Imagic, with their Living Literature series; Spinnaker, with its Windham Classics and Telarium (formerly Trillium) brands; Activision; Adventure International; and many others have all found the graphics-and-text field more hospitable when it comes to adventures. They argue that the future belongs to adventure gaming which includes increasingly sophisticated graphics as a part of the mix.

Whatever the outcome of that argument, everyone agrees that a game with graphics won't leave enough memory on today's 64K or 128K computers to permit as sophisticated a set of vocabularies, parsers, and underlying programming languages.

Synapse was trying something else quite different by choosing Pinsky. Game developers have increasingly sought big-name authors, primarily in the science fiction and fantasy genres, around which to base their adventure games. Names like Ray Bradbury, Isaac Asimov, Arthur C. Clarke, Michael Crichton, Douglas Adams, and others adorn the boxes of software programs. Some of these authors were heavily involved in the game development and others scarcely at all. No matter what the quality of a particular adventure game, all of those writers have a heavyweight pull in the computer game-playing community. While Pinsky's credentials and success as a talented poet, teacher, and editor are excellent, his visibility among computer game players would naturally be decidedly lower than the mass market superstars listed above.

In order to advance the all-text genre, however, Synapse was convinced that all-star names were not the answer. "A lot of times you may have a game with a [big name] involved, but he only spends two days on it, makes a few comments, and then leaves and goes off to write something else," says Mataga. "A writer's job in the text adventure is a lot of work. We need a writer who will be able to spend the time with us on the game, not just someone who will make a few suggestions on how the game will work, and then leave."



Mindwheel, *packaged in the form of a hardback book with disk, is one of a new breed of electronic novels from Synapse which blur the line between software and books.*

That sentiment is echoed by Douglas Adams and Steve Meretzky, who collaborated on Infocom's text adventure game, *The Hitchhiker's Guide to the Galaxy* based on Adams' book and radio series. (See "Inside View" in the April 1985 GAZETTE.) Meretzky, developer of the popular *Planetfall*, *Sorcerer*, and *Enchanter* Infocom games, worked extensively with Adams to make sure the humor and characterization of *Hitchhiker* remained intact.

"We started off spending a week in Boston, mapping it out, roughing it out, and writing bits of text," says Adams, a British writer whose books in the Hitchhiker series now number four. "Once we

FOR COMMODORE 64

"THE HOME ORGANIZERS ARE . . . INVALUABLE HELPMATES AND TIMESAVERS"

"Based on the powerful CONSULTANT™, a professional database manager, the HOME ORGANIZER series is for those of us who want the same power that a larger program offers, but without the headaches. Each of these dedicated programs has the screens and formatted printer reports already set up for you. All YOU have to do is enter the information!"

—Commodore Microcomputers Magazine*

It's all there, right at your fingertips. And the HOME ORGANIZERS are more than just electronic file cabinets. Each program has special functions built right in, to help you better manage your personal and household affairs. Like automatic calculations as soon as you enter data, with the "Checkbook" program. Or weekly menu planning with "Recipes". And much much more, to save you time and help you to organize your life.

The second best thing about the HOME ORGANIZERS is that it's so easy to use. You don't have to program anything, or set up formats—it's all done for you. Just load the disk, follow the on-screen directions, and enter data. What's the best thing? The price. **ONLY $29.95†**, an unbeatable price for programs that help you organize your home and your life in so many ways!

BATTERIES INCLUDED

"The Energized Software Company!"

WRITE FOR A FULL COLOR BROCHURE

186 Queen St. West
Toronto, Ontario,
M5V 1Z1 Canada
(416) 596-1405

17875 Sky Park North,
Suite P, Irvine, California
USA 92714

† MANUFACTURER'S SUGGESTED U.S. LIST PRICE.

*FOR A REPRINT OF THE ARTICLE AS IT ORIGINALLY APPEARED WRITE TO US. WE WILL BE GLAD TO SEND YOU A COPY. WE'RE PROUD OF IT.

© 1984 BATTERIES INCLUDED. ALL RIGHTS RESERVED COMMODORE IS A REGISTERED TRADE MARK OF COMMODORE BUSINESS MACHINES, INC.

got the ball rolling, I went back to England, and Steve and I communicated a lot through electronic mail. I would send ideas and bits of text, and he would start building it into the game. I would map out a lot of it broadly, and then bits of it in detail." The collaboration continued as Meretzky flew to London for more detailed work. Later the two worked together on the game once more in Boston, fine-tuning and reacting to the suggestions of game testers. The entire procedure took months, but both men agree the game is better for their mutual involvement.

Adams was one of the first writers to actually use the term "electronic novel," in the original 1977 edition of *The Hitchhiker's Guide*. "As far as I was concerned, it was completely imaginary," he says, laughing. "I didn't even become computer literate until about a year or so ago, whereupon it suddenly swept over me like a tidal wave."

As Pinsky worked with Mataga and Hales on *Mindwheel*, he came to see how his involvement was an important natural component of their creative process. He also became fascinated as a writer with the random interaction which attracts so many adventure game players.

"Once in a while, one of these games will give you goosebumps," he says with a hint of awe in his voice. "A friend played the game and said to a character, 'You look like my mother,' and the game character interpreted it as a command. She said, 'I will look the way you want me to.' My friend got spooked. You hit that once in a while now."

When Pinsky finally had an opportunity to sit down and play a few computer adventure games, what bothered him was that many of them were clever enough but devoid of mood and emotion. "They didn't have much color or aroma; they seemed flat.

"I think that the experience of writing poems was very good for this," he adds. "In poems, you're exposed to just getting it done in a small space. The more short and vivid a message can be, creating a narrative moment with the smallest possible number of words, the better."

Another writer involved with Synapse's series of electronic novels developed feelings similar to those of Pinsky. Jim Paul is a 34-year-old poet whose works have been published in *The New Yorker*, *The Paris Review*, and other magazines, and who also has written articles for *The Washington Post* and *The San Francisco Chronicle*. Currently a Stegner Fellow at Stanford University, Paul is the designer behind *Brimstone*, an all-text adventure based on Sir Gawain of King Arthur's Round Table, with additional material borrowed from Dante and William Blake.

"Writing on a page is a single line of narrative. The reader is a slave to the page," he says. "I had to anticipate paths for the reader. In writing a branching narrative like this, all choices are available at any given moment."

As a writer, Paul is intrigued by the game's ability to recognize synonyms and misspellings of words, translating them accurately. He also finds fascinating the way in which Mataga's BTZ language permits the game to have characters converse and situations develop which the author never wrote. "The computer is smart enough so that it can generate responses far beyond what I can do."

The Hitchhiker's Guide, *another all-text adventure game, is packaged in a distinctive format by Infocom to present the player with more than just a disk and instruction booklet.*

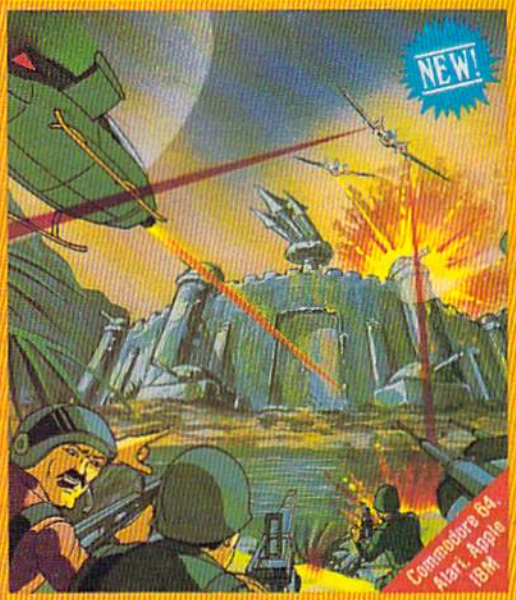
With the adventure game market still growing rapidly, Infocom's Steve Meretzky sees the early dominance of science fiction and fantasy themes giving way to other topics as new writers approach interactive fiction for the first time. "Back during the early days of personal computers, people who had them were the real hackers who tended to be science fiction fans. Therefore, most of them wrote programs which were science fiction or fantasy related.

Direct HITS!

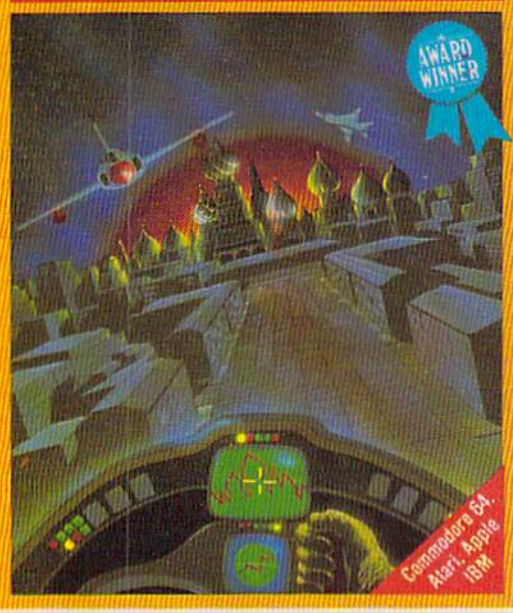
ACCESS **BEACH-HEAD** — As chief commander of armed forces in the Pacific, your first assignment is a tough one. Your mission is to obtain a quick naval victory and invade enemy territory with land forces. **BEACH-HEAD II** — The wartime drama continues with "The Dictator Strikes Back." **BEACH-HEAD II** is a true "head to head" two player game with voice simulation and superb multiscreen graphics. **RAID OVER MOSCOW** — The Soviets launch a first strike against the United States. Can your commandos react in time to stop the attack?

BEACH-HEAD

BEACH-HEAD II



RAID OVER MOSCOW



Mach 5 is a collection of powerful programs that enhance the capabilities of the C-64 with a 1541 disk drive. The package provides up to 500% faster program loading, 4K of additional basic workspace and disk cataloging.

Mach 5 Loader will load 95% of all programs up to 500% faster than a normal 1541 disk drive. Adds addition "single keystroke" commands to make life with your 1541 more pleasant. Mach 5 Basic modifies the C-64 kernal and basic ROMs to free up an additional 4K bytes of memory for use by basic language programmers. The workspace is increased from 38K to 43K while remaining fully compatible with normal CBM version 2 basic and Mach 5 Loader.

Mach 5 Disk Organizer is a comprehensive disk management program which will create a data disk containing directory information from the user's entire disk library. Disk names, file names and other important information is automatically extracted from a disk and cataloged for future reference. The user can then obtain a sorted list of all disks and all files within their library, or search for specific file names or parts of names. Output can be directed to either screen or printer.

ACCESS Software Incorporated

These Access Software products are compatible with the **Commodore 64, Atari, Apple II+/IIC/IIE** and **IBM PC/PC Jr.** Be sure to look for other Access Software products at a store near you.

Copyright 1985 Datasoft & Associates. All rights reserved.

As the computer market grows, that trend will reverse itself."

Peter Golden, another writer new to the creation of interactive fiction, designed two graphics and text adventures for Imagic/Bantam, *I, Damiano,* based on R. A. MacAvoy's Damiano fantasy trilogy; and *Sherlock Holmes: Another Bow,* both currently available only on IBM and Apple computers.

Although he previously had no involvement with computers, Golden is now impressed by the need within adventure games for a writer's knowledge of structure, word usage, descriptive techniques, and style in order to bring the program to life. It's a challenge he likes. "What compels someone to turn a page in a book is the same thing that compels an interactive fiction player to hit the return key. You have to get someone to turn the page.

Golden's involvement with the Holmes adventure quickly convinced him of the versatility players will see in future all-text formats. *Another Bow* takes place aboard a ship following World War I. Sherlock Holmes and his friend, Watson, must solve six different mysteries. In the course of the story, they meet such famous figures as Thomas Edison, Pablo Picasso, Gertrude Stein, and others. Golden chose Holmes, he says, because "it gave him a chance to be the most literary, to play with history, with style, and with the idea of writing dialogue." Golden also played with different speech patterns, from Southerners to Europeans, and with the idea of voice as used by different characters.

The conclusion Golden draws from his recent involvement is identical to that of Pinsky and Jim Paul: Writers will increasingly involve themselves in interactive fiction, complementing the talents which programmers bring to the genre. And as computer memory capacities rise from 64K and 128K to 512K and higher, the text adventure game will enter realms scarcely imagined today, giving writers even more latitude.

"We're looking out to a very exciting void," says Pinsky. "We don't know what people's imaginations are going to do with this tool. I can certainly see a whole new level of interactivity, actually putting a part of my dream life or fantasy life or emotional life into the game."

DI-SECTOR Version 2.0

EVERYTHING YOU EVER WANTED IN A DISK UTILITY . . . AND MORE!!
FOR THE COMMODORE 64*

★ Fully automatic back-up of almost any protected disk.
★ Copy files [PRG, SEQ, RND] with full screen editing.
★ Three minute back-up of standard disks [even many protected disks].
★ Format a disk in ten seconds. ★ View and alter sector headers.
★ Remove errors from any track/sector.
★ Edit sectors in HEX, ASCII — even assembler.
★ Create errors on any track/sector [20, 21, 22, 23, 27, 29] instantly.
★ Drive/64 MON, even lets you write programs inside your 1541.
★ All features are fully documented and easy to use.
★ None of our copy routines ever makes the drive head "kick."

Yes, you get all of this on one disk for this low price! $39.95

. . . Continuing Customer Support and Update Policy . . .

*Commodore 64 is a registered trademark of Commodore Business Machines

. . . WRITE OR PHONE . . .
STARPOINT SOFTWARE
Star Route 10 Gazelle, CA 96034 [916] 435-2371

All orders add $3.00 shipping/handling. California residents add 6% sales tax. COD orders add an add'l $4.00 shipping. Check, Money Order, VISA, and MasterCard accepted.

SUPER PRINTER PACKAGES

Gemini 10X and Cardco + G 323
Prowriter and Cardco + G 389
Panasonic 109 and Cardco G+ 364
Panasonic 1090 and Cardco G+ 295
Legend 880 and Cardco G+ 309

No additional shipping charges on Printer Packages in Continental USA

PRINTERS

Epson ..... Call
Silver Reed ..... Call
Prowriter 8510 .. 309
Riteman 289
Toshiba 1351 .... Call
Toshiba 1340 .... Call
Axiom-GM-550 . 279
Legend 880 239
Panasonic 1090 .. 219
Panasonic 1091 .. 285

Bring the trivia craze home with **P.Q. The Party Quiz Game** for the Atari and the CBM 64 . 49.95

COMMODORE 64

Star Micronics Inc. — The Power Behind The Printed Word.

Gemini 10X 245
Gemini 15X 389
Delta 10X 339
Delta 15X 499
Radix 10X 549
Radix 15X 629
Powertype 329

PRINTER INTERFACES

Axiom ..... Call
U-Print-C 64.95
Cardco G+ 69.95
Turboprint GT 69.95
Connection ..... Call

Indus GT Disk Drive . Call

Call for Special Package 64 System Price

CBM 64 ..... Call
1541 Disk Drive . Call
1530 Datasette . . 66
1702 Monitor . . Call

MODEMS

Hayes Smart Modem 300 Call
Mark VII / Auto Ans / Auto Dial ..... Call
Mark XII / 1200 Baud .... Call
Westridge AA / AD 74.95
Total Tele Modem 69.95
Mighty Mo 74.95

COMMODORE MODEM SPECIAL

Westridge Modem + VIP Terminal 119
Total Modem + VIP Terminal 115
Mighty Mo + VIP Terminal 119

Animation Station Touch Tablet 59.95

C O M M O D O R E 6 4 S O F T W A R E

ACCESS
Neutral Zone-D/T 23.95
Spritemaster-D/T 23.95
Beachhead-D/T 23.95
Master Composer-D ... 27.95
Raid Over Moscow-D/T 27.95
Scrolls Of Abadon-D/T 23.95

ACCESSORIES
WICO Joystick ..... Call
Flip 'n' File-D 20.95
Flip 'n' File Cart 20.95
Joysensor 24.95
WICO Trakball 37.95
EIS Compuserve Kit ... 64.95
VIDTEX 29.95
Gemini 10X 8K Upgrade . Call
Monitors ..... Call
Compuserve Starter ... 27.95
TAC III Joystick 14.95
U-Print Printer Buffer 16K, 32K or 64K ..... Call
Dust Covers ..... Call
Competition Pro Joystick Call
Gift Certificates ..... Call

ACTIVISION
Star League Baseball-D/T 23.95
On-Field Tennis-D/T . 23.95
Space Shuttle-D 24.95
On-Field Football-D ... 23.95
Designer's Pencil-D ... 24.95
Ghostbusters-D 29.95

AVALON HILL
Call for Items and Prices

BATTERIES INCLUDED
Super Busscard II ..... Call
Home Inventory-D 23.95
Recipe-D 23.95
Audio/Video Cat-D ... 23.95
Mail List-D 23.95
Stamps-D 23.95
B.I. 80 Card ..... Call
Home Pak-D 37.95
Cal-Kit ..... Call

BRODERBUND
Bank Street Writer-D .. 34.95
Operation Whirlwind-D 27.95
Mask of the Sun-D ... 27.95
Dr. Creep-D 20.95
Gumball-D 20.95
Bungeling Bay-D 20.95
Spelunker-D 20.95
Stealth-D 20.95
Whistler's Brother-D .. 20.95
Championship Loderunner-D 23.95
Print Shop-D 34.95
Serpent's Star-D 27.95
Karetka-D 20.95

CARDCO
Cardprint/B 47.95
Cardco + G 69.95
Cardboard/5 ..... 59.95
Cardkey 39.95
Cassette Recorder 37.95

CARDCO (cont.)
Printer Utility-D/T . 19.95
Write Now-Cart ... 34.95
Mail Now-D 29.95
File Now-D 29.95
Graph Now-D 29.95
Spell Now-D 29.95
Calc Now-D 29.95
Super Disk Utility-D 69.95

CBS SOFTWARE
Call for Items and Prices

COMMODORE
Assembler-D 39.95
Easy Finance I, II, III, IV-D 19.95
Easy Calc-D 34.95
Easy Mail-D 19.95
Easy Script-D 44.95
Easy Spell-D 19.95
Logo-D 49.95
The Manager-D 34.95
General Ledger-D 34.95
Accts. Rec.-D 34.95
Accts. Pay.-D 34.95
Magic Desk-Cart 39.95
Int. Soccer-Cart 22.95
Magic Voice 54.95
Suspect-D 24.95
Cutthroats-D 24.95
Simon's Basic-Cart ..... Call
Inventory Man-D 34.95
Super Expander . Cart . 29.95
Just Imagine-D 24.95
Micro-Illustrator-D 21.95
Micro-Astrologer-D 21.95
Chess-D 21.95
Rally Speedway-D 21.95
Hulk-D 21.95
Spiderman-D 21.95

DATASOFT
Conan/Barbarian-D/T 27.95
Bruce Lee-D/T 27.95
Lost Tomb-D/T 23.95
Mr. Do-D/T 27.95
Dig Dug-D 20.95
Pole Position-D 20.95
Pacman-D 20.95

DISKETTES
Dysan .....
Verbatim ..... Call
Certron ..... For
Elephant ..... 10 Pak
Maxell ..... And
Memorex ..... Quantity
Ultra-Magnetics ..... Pricing
BASF .....
Wabash .....

D-Disk T-Cassette Cart-Cartridge

DYNATECH
Adventure Writer-D 41.95
Codewriter-D 69.95
Dialog-D 41.95
Elf System-D 41.95
Home File Writer-D ... 41.95
Reportwriter-D 41.95
Menuwriter-D 34.95
Speedwriter-D 49.95

ELECTRONIC ARTS
Archon-D 29.95
Pinball Construction-D. 29.95
M.U.L.E.-D 29.95
Murder/Zinderneuf-D 29.95
One On One-D 29.95
Archon II-D 29.95
Financial Cookbook-D . 37.95
Music Construction-D . 29.95
7 Cities Of Gold-D 29.95
Standing Stones-D 29.95
Mail Order Monster-D . 29.95
Adventure Construction Kit-D 37.95
Racing Destruction Kit-D 29.95

EPYX
Dragons/Pern-D/T ... 27.95
Pitstop II-D 27.95
Robots of Dawn-D 27.95
Summer Games 27.95
Impossible Mission-D . 23.95
World's Greatest Baseball-D 23.95
Fast Load-Cart 27.95
Scrabble-D 27.95

FIRST STAR
Call for Items and Prices

HANDIC
64 Forth-Cart 29.95
64 Graf-Cart 23.95
Stat 64-Cart 23.95
Calc Result Easy-Cart . 34.95
Calc Result Adv.-Cart . 69.95
The Diary-Cart 23.95
The Tool-Cart 29.95
Bridge Cart 29.95

HESWARE
Hesware ..... Call

INSTA (CIMMARON)
Insta-Writer-Cart 34.95
Insta-Mail-D 27.95
Insta-File-D 44.95
Management Combo .. 69.95
Insta-Calc-Cart/D ... 34.95
Insta-Graph-D 24.95
Insta-Vestor-D 29.95
Insta-Speed-D 64.95
Invest Combo 64.95
Word Craft-D 44.95
Insta-Ledger-D ..... Call

INFOCOM
Deadline-D 29.95
Enchanter-D 23.95
Infidel-D 29.95
Planetfall-D 24.95
Sorcerer-D 29.95
Starcross-D 29.95
Suspended-D 29.95
Witness-D 29.95
Sea Stalker-D 24.95
Zork I, II, or III-D 27.95

KOALA
Gibson Light Pen 69.95
Koala Touch Tablet-D . 69.95
Koala Touch Tablet-C . 74.95
Muppet Learn Keys-D . 54.95

MICROFUN
Call for Items and Prices

MICROPROSE
Floyd/Jungle-D 23.95
Hellcat Ace-D/T 23.95
NATO Commander-D .. 23.95
Solo Flight-D/T 23.95
Spitfire Ace-D/T 23.95
Air Rescue-D/T 23.95
Challenger-D/T 23.95
F-15 Strike Eagle-D ... 23.95

MINDSCAPE
Call for Items and Prices

MISCELLANEOUS
Quick Brown Fox-D/Cart 34.95
Ultima III-D 41.95
Flight Simulator II-D ... 37.95
Night Mission/ Pinball-D/T 20.95
Home Accountant-D .. 49.95
Barron's Sat.-D 67.95
Telestar 64-Cart 37.95
Castle Wolfenstein-D .. 20.95
Mastertype-D 27.95
Aztec-D 27.95
Miner 2049er-Cart 27.95
Strip Poker-D 23.95
Astro Chase-D/T 20.95
Flip Flop-D/T 20.95
Beyond Wolfenstein-D . 23.95
Sam-D 41.95
Mae Assembler-D 49.95
Jupiter Mission-D 34.95
Barron-D 37.95
Tycoon-D 37.95
Millionaire-D 27.95
Kwik-Load-D 16.95
Sargon III-D 34.95
Bruce Lee-D/T 23.95
Mancopter-D 27.95
Meridian III-D 27.95
Mastering The Sat-D . 104.95
Hes Forth-Cart 31.95

MISCELLANEOUS (cont.)
Pogo Joe-D/T 20.95
Movie Maker-D 32.95
Typing Tutor III-D 34.95
Space Taxi-20.95
Vip Terminal 41.95
Doodle-D 27.95
Superbase-64D 69.95
Indiana Jones-D 23.95
Ultima IV-D 41.95
Adventure Master-D ... 34.95
Adventure Writer-D 41.95
Codewriter-D 69.95
Spy vs. Spy-D 23.95
Death/Caribbean-D .. 27.95
Boulder Dash-D 27.95
The Heist-D 23.95
Montezuma's Revenge-D 29.95
Gyruss-Cart 34.95
Spy Hunter-D 29.95
Tapper-D 29.95
Ultima II-D 41.95
Blue Max-D/T 23.95
Relax-D 79.95
Zaxxon-D/T 27.95
Koala-Printer-D 19.95
Frogger-D/T 23.95
Get Rich Series-D 34.95
Strip Poker-D 23.95
Micro-League Baseball-D 29.95
Home Pak-D 37.95
Movie Maker-D 37.95

PARKER BROTHERS
Call for Items and Prices

SCARBOROUGH
Mastertype-D/Cart 27.95
Net Worth-D 54.95
Songwriter-D 27.95
Run for the Money-D .. 27.95
Figures and Formulas-D 20.95
Writing Wizard-D 49.95

SCHOLASTIC
Call for Items and Prices

SCREENPLAY
Call for Items and Prices

SEGA
Call for Items and Prices

SIERRA ON-LINE
Call for Items and Prices

SPINNAKER
Adventure Creator-Cart . 22.95
Aerobics-D 27.95
Alf in the Color Caves-C 22.95
Alphabet Zoo-Cart 22.95
Delta Drawing-Cart ... 22.95
Facemaker-Cart 22.95
Fraction Fever-Cart 22.95
Kids on Keys-Cart 22.95

SPINNAKER (cont.)
Kidwriter-D 22.95
Snooper #1-D 22.95
Snooper #2-D 22.95
Story Machine-Cart ... 22.95
Trains-D 22.95
Grandma's House-D .. 19.95

SSI
50 Million Crush-D ... 27.95
Battle/Normandy-D/T 27.95
Combat Leader-D/T .. 27.95
Computer Baseball-D . 27.95
Cosmic Balance-D 27.95
Eagles-D 27.95
Fortress-D 23.95
Germany 1985-D 41.95
Knight/Desert-D/T ... 27.95
Professional Golf-D ... 27.95
RFD 1985-D 23.95
Ringside Seat-D 27.95
Tigers in the Snow-D .. 27.95
Baltic 85-D 23.95
Broadsides-D 27.95
Questron-D 27.95
Computer Quarterback-D 27.95
Field of Fire-D 27.95
Carrier Force-D 41.95
Breakthrough/Ardennes-D 41.95
President-Elect-D 27.95

SYNAPSE
Call for Items and Prices

TIMEWORKS
Accounts Payable/ Checkwriter-D 41.95
Accounts Receivable/ Invoice-D 41.95
Cash Flow Management-D 41.95
Data Manager 2-D ... 34.95
Data Manager-D/T ... 19.95
Dietron-D/T 19.95
Dungeon Algebra Dragon-D/T 19.95
Electronic Checkbook-D/T 19.95
General Ledger-D 41.95
Inventory Management-D 41.95
Money Manager-D/T .. 19.95
Payroll Management-D 41.95
Evelyn Woods-D 49.95

TRILLIUM
Amazon-D 22.95
Dragonworld-D 22.95
Farenheit 451-D 22.95
Rendezvouz w/Rama . 22.95
Shadowkeep-D 22.95

WAVEFORM
Call for Items and Prices

WINDHAM CLASSICS
Call for Items and Prices

Hundreds of items available for the CBM 64, please call

To Order Call Toll Free
800-558-0003

For Technical Info, Order Inquiries, or for Wisc. Orders -
414-351-2007

NEW LOWER PRICES

ComputAbility™

NEW PRODUCTS

NO SURCHARGE FOR MASTERCARD OR VISA

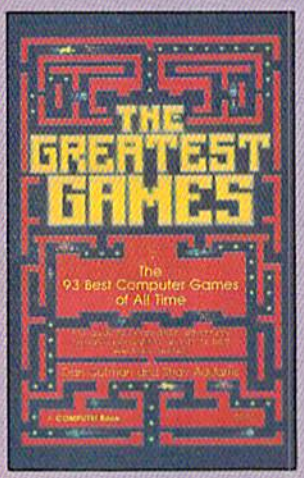
Est. 1982

ORDERING INFORMATION. Please specify system. For fast delivery send cashier's check, money order or direct bank transfers. Personal and company checks allow 2 weeks to clear. Charges for COD are $3.00. School Purchase Orders welcome. In CONTINENTAL USA, include $3.00 shipping per software order. Include 3% shipping on all Hardware orders, minimum $3.00. Mastercard & Visa please include card # and expiration date. WI residents please add 5% sales tax. HI, AK, FPO, APO, Canadian orders — add 5% shipping, minimum $5.00. All other foreign orders, please add 15% shipping, minimum $10.00. All goods are new and include factory warranty. Due to our low prices, all sales are final. All defective returns must have a return authorization number. Please call 414-351-2007 to obtain an RA# or your return will NOT be accepted for replacement or repair. Prices and availability are subject to change without notice.

COMPUTABILITY
P.O. Box 17882
Milwaukee, WI 53217

ORDER LINES OPEN
Mon-Fri 11 AM - 7 PM CST
Sat 12 PM - 5 PM CST

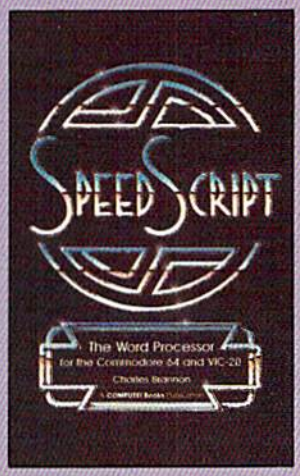
COMPUTE! BOOKS
FOR ALL YOUR HOME COMPUTING NEEDS



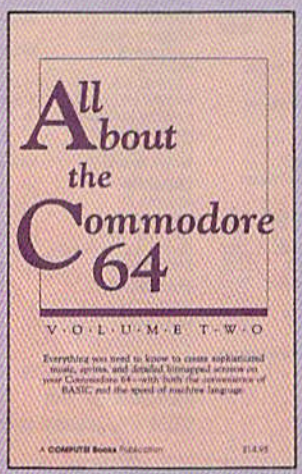
The Greatest Games, The 93 Best Computer Games of All Time
Dan Gutman and Shay Addams
$9.95

With hundreds of computer games available for every home, how's a game enthusiast to decide which ones to buy? *The Greatest Games,* written by the founders and editors of *Computer Games* Magazine, has the answers. It contains lively in-depth reviews of the 93 greatest computer games. Eighteen different types of games are reviewed, including role-playing games, graphic adventures, sports games, and classic arcade games. This is a book every computer game lover will want to own.

SpeedScript: The Word Processor for the Commodore 64 and VIC-20
Charles Brannon
$9.95.



SpeedScript, the most popular program ever published by COMPUTE! Publications, is a commercial-quality word processor for the Commodore 64 and expanded VIC. Included here are all the programs and documentation necessary for both versions of *SpeedScript.* In addition, we've included source code and documentation about *SpeedScript* that have never been published before. For the price of the book, you get a commercial-quality word processor—perhaps one of the best software bargains ever.



All About the Commodore 64, Volume Two
Craig Chamberlain
$16.95

Here's something for people who know the BASIC language, but find it too slow or limiting for some applications. The book offers a variety of powerful machine language utility programs that make sound and graphics far more accessible. It is divided into four sections: Advanced BASIC, Bitmapped Graphics, Sound (including a very sophisticated sound editor and player), and a sprite control system.

Our new Spring releases bring you programming instructions, buying tips, business utilities, home applications, and exciting games for you to use and enjoy.

Look for these and other best-selling titles from COMPUTE! Books at your local bookstore or computer store, or order directly from COMPUTE! Publications.
Call 800-334-0868 for more information.

COMPUTE! Publications, Inc. abc
One of the ABC Publishing Companies
324 W. Wendover Avenue, Suite 200, Greensboro, NC 27408. 919-275-9809.
Publishers of COMPUTE!, COMPUTE!'s Gazette, COMPUTE!'s Gazette Disk, COMPUTE! Books, and COMPUTE!'s Apple Applications.

A Guide To Commodore User Groups
Part 2

The second half of the user group guide includes states N–Z and countries outside the U.S. We will continue to publish updates in future issues. Send additions, corrections, and deletions to:

COMPUTE! Publications
P.O. Box 5406
Greensboro, NC 27403
Attn: Commodore User Groups

NEBRASKA

The Alliance Commodore Computer Club, M. Sallee, 1629 Boise, Alliance, NE 69301, (308) 762-6228

Mid-Nebraska Users of Commodore (MUC), Bob Luebbe, 3220 W. 13, Apt. 9, Grand Island, NE 68801, (308) 382-1933

Rivercity Commodore Club, Richard d'Autremont, 2742 Newport Ave., Omaha, NE 68112

Greater Omaha Commodore 64 User Group, Bob Quisenberry, 2932 Leawood Drive, Omaha, NE 68123, (402) 292-2753

NEVADA

S.O.G. Commodore User Group, Lee Schram, c/o IC Electronics, 4011 W. Charleston Blvd., Las Vegas, NV 89102, (702) 646-5656

CLONE, Lee Huntley, 6438 E.Goldmine Dr., Las Vegas, NV 89115

NEW HAMPSHIRE

Amoskeag C-64 User Group, Brad and Nancy Mayer, 61 Prospect St., Manchester, NH 03104, (603) 669-6277

C-64 Users, P.O. Box 4022, Rochester, NH 03867

Monadnock Commodore 64 Users, c/o Paul F. Rule III, RFD No. 1, Rt. 10, Winchester, NH 03470, (603) 352-6722

NEW JERSEY

Bordentown Area Commodore Users Group, Joe Griner, P.O. Box 381, Bordentown, NJ 08505

South Jersey Commodore Users Group, Mark Orthner, P.O. Box 4205, Cherry Hill, NJ 08034

Somerset Users Group, Stan Kosciuk, 5 Shasta Pass, Fanwood, NJ 07023, (201) 889-5520

Morris Area Commodore User Group, Bob Searing, 51 Ferncliff Rd., Morris Plains, NJ 07950

RCA Commodore Users Group (RCACUG), William Rowe, 432 Hemlock Lane, Mt. Holly, NJ 08060

Rancocas Valley User Group, M. Eisenbacher, P.O. Box 234, Mt. Laurel, NJ 08054, (609) 267-1912

Info-64 c/o Video Dynamics, Ltd., 16 W. Ridgewood Ave., Ridgewood, NJ 07450, (201) 447-4422

Jersey Shore Commodore Users Group, Robert McKinley, George Decker; 89 Stratford Rd., Tinton Falls, NJ 07724, (201) 542-2113; 223-1387

Ewing Commodore Users Group, John C. Jones, 11 Van Saun Dr., Trenton, NJ 08628, (609) 882-4826

Commodore 64 Users Group, Thomas Martin, 680 Leigh Terrace, Westwood, NJ 07675, (201) 664-3304

NEW MEXICO

New Mexico Commodore User's Group, Susan Palmer, P.O. Box 37127, Albuquerque, NM 87176

The Southern New Mexico Commodore User's Group, David Selwyn, P.O. Box 4437, Uni. Park Brch, Las Cruces, NM 88001, (505) 522-7622

The Northern New Mexico Commodore Users Group, David Martinez, 2725 Camino Cimarron, Santa Fe, NM 87501, (505) 471-3110 evenings

NEW YORK

Adirondack Commodore 64 User Group, Jean B. Kerst, P.O. Box 99, Blue Mt. Lake, NY 12812, (518) 352-7740

Brentwood-Bayshore VIC/64 User Group, Serafin R. Vargas, Pub. Lib. 2nd Ave. & 4th St., Brentwood, NY 11717, (516) 273-7883

Commodore Computer Game Masters of the Bronx, Etc.(CCGMB) (C-64 only), Michael A. Soto, Jr., 4526 Monticello Ave., Bronx, NY 10466, (212) 994-5762 (5–8 p.m., weekends 12–5 p.m.)

Folklife Terminal Club, John Krebs, P.O. Box 555-C, Bronx, NY 10475

Brooklyn Commodore User's Group, Malcolm J. Gottesman, 1735 E. 13th St., Apt.7N, Brooklyn, NY 11229-1950, (718) 375-5278

North Buffalo Commodore Users' Group, Jon Hilgreen, 309 Commonwealth Ave., Buffalo, NY 14216, (716) 873-8332

Long Island VIC Society (L.I.V.I.C.S.), Lawrence Stefani, 20 Spyglass Lane, East Setauket, NY 11733, (516) 751-7844

Academy of Aeronautics C-64 Users Group, John Karakian, Aircraft Technology Dept., Academy of Aeronautics, La Guardia Airport, Flushing, NY 11371 (Membership limited to those attending academy.)

Great Neck Commodore User Group, Adam Korn, 30 Grace Ave., Great Neck, NY 11021, (516) 482-5480

Long Island VIC Enthusiasts, Arnold Friedman, 17 Picadilly Rd., Great Neck, NY 11023

Finger Lakes Area Komputer Experts (F.L.A.K.E.S.), Terri Lynne Narby, 86 West Lake Rd., Hammondsport, NY 14840, (607) 868-3674

Highland Falls Commodore Users Group, Kevin R. Mandoske, 8 Knox Rd., Highland Falls, NY 10928, (914) 446-2802

Commodore Computer Users Group of Ithaca, Max Paperno, 202 Bridge St., Ithaca, NY 14850, (607) 277-3981, BBS: (607) 272-9306

MI-64, Alex Migliozzi, 4 Essex Place, Jericho, NY 11753, (516) 681-2391

Hudson Valley Commodore Club, Ric Wright, P.O. Box 2190, Kingston, NY 12401, (914) 382-1561

VIC-20 Commodore 64 User Group, John Mason, P.O. Box 280, Lindenhurst, NY 11757

Central New York Commodore Users Group, Carl Bittel, 8037 Morgan Rd., Liverpool, NY 13088, (315) 622-2913

64 Club, Kevin DeNardo, P.O. Box 2394, Liverpool, NY 13089, (315) 457-1725

Plattsburgh Commodore Users Group, Steve Nolan, 61 E. Main St., Morrisonville, NY 12962, (518) 563-5764

Commodore 64 User Group of Orange County, Stephen Gerstl, Box 238, RD 1, New Hampton, NY 10958, (914) 355-1478

CMI Commodore Club, Rusty Staub, 243 Main St., New Paltz, NY 12561, (914) 255-1500

New York Commodore Interest User Group (NYCIG), Ben Tunkelang, 380 Riverside Dr. 7Q, New York, NY 10025

Metropolitan Life Insurance Users Group, Harry Kristy, P.O. Box 618, New York, NY 10159

Northern New York Commodore Home User Group (NORNY-CHUG), Andrew VanDuyne, P.O. Box 226, Norwood, NY 13668, (315) 353-4591

North Country Commodore Club, Eleanor Cunningham, 1607 Ford St., Ogdensburg, NY 13669, (315) 393-2708

ESUG, 52 Underhill Rd., Ossining, NY 10562, (914) 941-2378 or (914) 941-0385

Oswego Commodore User Group, John Boronkay, 208 Park Hall, Dept.of Technology, SUC, Oswego, NY 13126, (315) 341-3010

Club 64, Chris C. Theodore, 174 Maple Ave., Patchogue, NY 11772, (516) 289-9271

Commodore Users Group of Rochester (CUGOR), P.O. Box 26514, Rochester, NY 14626

Rockland County CPU (C-64 Professional Users) Group, Brian Telesh, 98 West Central Ave., Spring Valley, NY 10977

The Commodore Computer Club of Syracuse, P.O. Box 2232, Syracuse, NY 13220

64 Southtowns User Group, Michael Leskow, 504 Sommerville Rd., Tonawanda, NY 14150, (716) 837-5643

Commodore Buffalo User Group (COMBUG), David A. Newton, 199 Dale Drive, Tonawanda, NY 14150, (716) 695-1626

Mohawk Valley Commodore User Group, William A. Nowak, P.O. Box 343, Tribes Hill, NY 12177, (518) 829-7576

Utica Commodore User Group, Phil Rothstein, 1801 Storrs Ave., Utica, NY 13501, (315) 733-2244

Orange County Commodore Users Group, (O.C.C.U.G.), P.O.Box 515, Vails Gate, NY 12584

NORTH CAROLINA

Asheville-Buncombe User Group (A-BUG), Bob McFee, P.O. Box 15578, Asheville, NC 28813, (704) 254-5581

Raleigh VIC-20/64 User Group, Jerry Mersch, 405 Willow Brook Drive, Cary, NC 27511, (919) 467-7107

Commodore Users Group of Fayetteville (CUGOF), Steve Peterson, P.O. Box 41601, Fayetteville, NC 28309, (919) 864-6972

Triad C-64 Users Group, P.O. Box 10833, Greensboro, NC 27404

VIC-20/C-64 User Group, David C. Fortenberry, Rt. 3, Box 351, Lincolnton, NC 28092, (704) 732-0932

Down East Commodore User Group, Ward H. Zimmerman, P.O. Box 525, Newport, NC 28570, (919) 223-3537

Commodore 64 Research Triangle User Group, Mike Stroud, 2213 Wininger Dr., Raleigh, NC 27603, (919) 772-4112

Wilmington Commodore Users Group (WCUG), Terry M. Brown, 409 R.L. Honeycutt Drive, Wilmington, NC 28403, (919) 799-5041

NORTH DAKOTA

Central Dakota Commodore Club, Bob MacLeod, 102 East Capitol Ave., Bismarck, ND 58501, (701) 223-3390

OHIO

Akron Area Commodore User Group, Patrick Papania, Rm. B-201, 80 W. Bowery, Akron, OH 44308

Mid-Ohio Commodore User's Club, Michael A. Bilbee, 66 Main St., Butler, OH 44822

Akron Area Commodore Club (AACC), Dan Shibley, 1443 Wendy St.#88, Canton, OH 44709, (216) 762-1934

Central Ohio Commodore Users Group, Philip Lynch, 3450 Wilson Woods Dr. Apt. J., Columbus, OH 43204, (614) 274-0304, BBS: (614) 274-6502

Chillicothe Commodore User Group (C.C.U.G.), Charles Rechner, 9 Ash Rd., Chillicothe, OH 45601, (614) 775-3839

Akron Area C-64 Users Group, Paul M. Hardy, 2453 Second St., Cuyahoga Falls, OH 44221, (216) 923-4396

Galion Commodore User Group, Doug Osborne, 980 Bucyrus Rd., Galion, OH 44833, (419) 468-5534

WESTCOM 64 Commodore 64 Users Group of Western Cincinnati, Rick Olano, 156 Citation Circle, Harrison, OH 45030, (513) 367-2668

Marion Ohio Commodore User Group (MOCUG), Van Munro, 775 Wolfinger Rd., Marion, OH 43302, (614) 726-2630

Northeast Ohio Commodore User Group, Ross Black, P.O. Box 718, Mentor, OH 44061, (216) 942-4132

Commodore 64 Users Group, Jeff Eklund, 702 Park Ave. NW, New Philadelphia, OH 44663, (216) 364-6158

Commodore Computer Club of Toledo (CCCT), P.O. Box 8909, Toledo, OH 43623

OKLAHOMA

Commodore Users of Bartlesville, Fred Mayes, 1704 S. Osage, Bartlesville, OK 74003, (918) 336-0233

Commodore Users, Monte Maker, P.O. Box 192, Guthrie, OK 73044

Muskogee Commodore Users Group, Steve Ford, 202 S. 12th St., Muskogee, OK 74401

Greater Oklahoma Commodore Club, Randy Hill, 1401 N. Rockwell, Oklahoma City, OK 73127, (405) 732-4956

Tulsa Area Commodore Users Group, Craig Bowman, 7804 N. 117th E. Ave., Owasso, OK 74055, (918) 272-9755

OREGON

Astoria Commodore User Group, Bob Carson, Rt. 3, Box 75, Astoria, OR 97103, (503) 325-1890

Beaverton 64 User Group, Jack Simpson, 11855 S.W. Ridgeview Terrace, Beaverton, OR 97005, (503) 646-9596

Klamath Commodore 64 User Group, Mrs. Juanita Eiteneier, P.O. Box 7654, Klamath Falls, OR 97602

Amateur Radio Group, Jim Meyers, P.O. Box 626, Molalla, OR 97038, (503) 239-8888

Albany Corvallis C-64 User Group, Nellie Stratton, 800 South 19th, Philomath, OR 97370

Mount Hood Community College Commodore 64 Users Group, Ted Scheinman, 4044 NE Couch, Portland, OR 97232

North/Northeast Commodore User Group, Mike Daigle, P.O. Box 17580, Portland, OR 97217, (503) 289-5179

Pacific Northwest Commodore User Group, Denny Kruse, P.O. Box 2310, Roseburg, OR 97470, (503) 673-1055

United States Commodore Users Group, Richard Tsukiji, P.O. Box 2310, Roseburg, OR 97470, (503) 673-3321

Salem C-64 Users Group, Bud Rasmussen, 3795 Saxon Drive S., Salem, OR 97302, (503) 585-1515, BBS: (503) 588-2364 (24 hours)

Yamhill County Commodore Users Group, Dan Linscheid, Rt. 2 Box 246, Sheridan, OR 97378, (503) 843-2625

PENNSYLVANIA

Lehigh Valley Commodore User Group, Hiram Cook, 2228 Baker Drive, Allentown, PA 18102, (215) 791-3938

B.A.S.I.C., Dimitri N. Dantos, 1433 13th Ave., Altoona, PA 16601, (814) 942-9565

COMPSTARS, Mike Norm, 3770 Worthington, Collegeville, PA 19426

Worldwide Commodore User Groups—Pottstown/Boyertown Area Chapter, Dave Walter/Richard Franklin, R.D. #1, Washington Rd., Bechtelsville, PA 19505, (215) 584-4483

Worldwide Commodore Users Group (International Headquarters), Anthony Richards, P.O. Box 337, Blue Bell, PA 19422

Castle Commodores Computer Club, Dean G. Thomas, R.D. #1, Box 210A, Edinburg, PA 16116, (412) 652-3352

Naval Air Development Center, Commodore User Club, Alan Blumenthal, 912 Fraser Rd., Erdenheim, PA 19118, (215) 441-2580

North Coast Commodore Users Group Erie (Main) Chapter, Denny Witkowski, P.O. Box 6117, Erie, PA 16512-6117, (814) 866-1625

North Coast Commodore Users Group Edinboro (County) Chapter, Robert Glenn, P.O. Box 6117, Erie, PA 16512-6117, (814) 398-8146

Westmoreland Computer Users Club (Commodore Section), Jim Mathers, 3021 Ben Venue Drive, Greensburg, PA 15601, (412) 836-2224

United States Commodore Users Group, Michael J. Frye, 1255 Brinkerton Rd., Greensburg, PA 15601, (412) 423-7696 (6–11 p.m.)

Cen.P.U.G. for Commodore, Jeffrey Hendershot, RD #1, RC #17, Howard, PA 16841, (717) 962-2495

Wyoming Valley Commodore Users Group, John Youells, 94 Second Ave., Kingston, PA 18704, (717) 288-7264

Capitol Area Commodore Club, William Zoller, P.O. Box 333, Lemoyne, PA 17043

Lowerbucks User Group, Donald Moyer, 252 Makefield Rd., Morrisville, PA 19067, (215) 295-3591

CUBBS Commodore Users Group, 500 Diller Ave. (M.S. 1022), New Holland, PA 17557

A-K 64 User Group, Alton E. Glubish, 1762 Fairmont St., New Kensington, PA 15068, (412) 335-9070

Worldwide Commodore User Groups—Norristown Chapter, Dave Walter/Richard Franklin, 110 Miami Ave., Norristown, PA 19403, (215) 948-6542

Oxford Circle 64 Users Group, Allen Kozin, 784 Smylie Rd., Philadelphia, PA 19124, (215) 535-9075

United Users Incorporated ATTN:Commodore Division, 1931 Rockledge St., Pittsburgh, PA 15212, (412) 321-0928

Pittsburgh Area Commodore User Group (P.A.C.U.G.), Robert Borowski, 302 Penn St., Pittsburgh, PA 15215, (412) 782-0319

Bettis Commodore Users Group, Bill Campbell, 592 Arbor Lane, Pittsburgh, PA 15236

Pittsburgh Commodore Group, Joel A. Casar, 2015 Garrick Drive, Pittsburgh, PA 15235

Cen.P.U.G. for Commodore, Joseph Coffman, Box 102, Salona, PA 17767, (717) 726-4564

Upper Buxmont C64 Users, Don Roques, 655 Bergey Rd., Telford, PA 18969, (215) 723-7039

Main Line Commodore Users Group (MLCUG), Emil Volcheck, 1046 General Allen Lane, West Chester, PA 19382, (215) 388-1581

South Pittsburgh Commodore Group, Charles W. Groves III, 2407 PA Ave., West Mifflin, PA 15122, (412) 466-3314

West Branch Commodore Users Group, Gene Loveland, P.O. Box 995, Williamsport, PA 17703, (717) 323-7901

RHODE ISLAND

Narragansett Commodore Users Group, Robert R. Payne, EPA Environmental Research Lab, South Ferry Rd., Narragansett, RI 02882, (401) 885-2458 (evenings 6–9 p.m.)

Newport Computer Club, P.O. Box 1439, Newport, RI 02840

SOUTH CAROLINA

Beaufort Technical College User Group, Center For Staff And Curriculum Development, P.O. Box 1288, Beaufort, SC 29902, (803) 524-3380 (ext. 204)

Commodore Computer Club of Columbia, Buster White, P.O. Box 2775, Cayce/W. Columbia, SC 29171, (803) 772-0305

The Executive Touch (E.T.), Patricia Watkins, 208 Highway 15, Myrtle Beach, SC 29577, (803) 448-8429

Charleston Computer Society, Jack A. Furr, Jr., P.O. Box 5264, N. Charleston, SC 29406, (803) 747-0310, BBS: (803) 747-6981

Rock Hill Commodore User Group (RHCUG), Robbie Smarzik, 565 Scaleybark Circle, Rock Hill, SC 29730, (803) 366-7918

SOUTH DAKOTA

VIC-64 User Club, Larry J. Lundeen, 608 W. 5th, Pierre, SD 57501, (605) 224-4863

Sioux Falls User Group, Brandon Ulrich, 4200 S. Louise Suite 304, Sioux Falls, SD 57106, (605) 361-0833

TENNESSEE

Commodore Computer Club, Marty Garner, P.O. Box 96, Estill Springs, TN 37330, (615) 649-5962

Old Hickory Commodore Users Group, Joseph H. Toy, 25 Coats Cove, Jackson, TN 38305, (901) 424-4686

Metro Knoxville Commodore User Club, Ed Pritchard, 7405 Oxmoor Rd., Rt. #20, Knoxville, TN 37931, (615) 938-3773

Memphis Commodore Users Club, P.O. Box 34095, Memphis, TN 38134-0095, (901) 362-5632

Nashville Commodore User Group, Dave Rushing, P.O. Box 121282, Nashville, TN 37212, (615) 331-5408

TEXAS

Commodore User Group, Alice Jason Perkins or Shane Lind, 13314 Corozan, Alice, TX 78332, (512) 664-6887

Commodore User Group of Austin, P.O. Box 49138, Austin, TX 78765

Mid-Cities Commodore Club, P.O.Box 1578, Bedford, TX 76021, Metro (817) 498-0899

Corpus Christi Commodores, Bob McKelvy, P.O. Box 6541, Corpus Christi, TX 78411, (512) 852-4426

FED 64 Computer Club, Pat Zembower/OPM, 4100 Commerce St., Dallas, TX 75242, (214) 767-8245

64 User Group, P.O. Box 801828, Dallas, TX 75380, (214) 239-7665

Irving Commodore Users Club, Louis Cantu, P.O. Box 165034, Irving, TX 75016, (214) 790-4769

Longview Users Group, P.O. Box 9284, Longview, TX 75608, (214) 759-3459

South Plains 64 User Group, John N. Bottoms, Sr., 7709 Ave. W., Lubbock, TX 79423, (806) 745-4381

Lubbock Commodore Users Group, Robert Massengale, 3817 64th Drive, Lubbock, TX 79413

BiStone Users Club, R.G. Gore, P.O. Box 386, Mexia, TX 76667, (817) 562-6808

The Users, Brad Lewis, 209 Altavista, Rockwall, TX 75087, (214) 722-9774

Commodore (Houston) User Group (CHUG), Mary and John Howe, 23502 Creekview Drive, Spring, TX 77379, (713) 376-7000 (713) 721-8542 (tape-recorded meeting info)

The Woodlands Commodore Users Group, Andrew Gardner, 3 Splitrock Rd., The Woodlands, TX 77380, (713) 292-8987

Crossroads Commodore Users' Group, Jerry Guy, 417 Irma Drive, Victoria, TX 77901, (512) 575-0342

Heart of Texas Commodore Home User Group (HOT CHUG), Lt. Mike Stuff, 2100 N. New Rd., Waco, TX 76710

UTAH

Wasatch Commodore Users Group (WACUG), Mike Murphy, P.O. Box 4028, Ogden, UT 84402, BBS: (801) 773-5512

Uintah Basin Commodore Users Club, John Weight, 373 East 650 North 97-3, Roosevelt, UT 84066

VERMONT

Champlain Valley Commodore Users Group, Steve Lippert, 6 Mayfair, South Burlington, VT 05401, (802) 658-4160

VIRGINIA

The Franconia Commodore Users Group, Mark Sowash, 5924 Dove Drive, Alexandria, VA 22310, (703) 971-5021

NAVAIR Commodore User Group, Jon Steeby, 4423 Raleigh Ave. #102, Alexandria, VA 22304

Arlington VICtims (20/64), Robin Franzel, 5521 Harvey Ln., Alexandria, VA 22312, (703) 256-7230

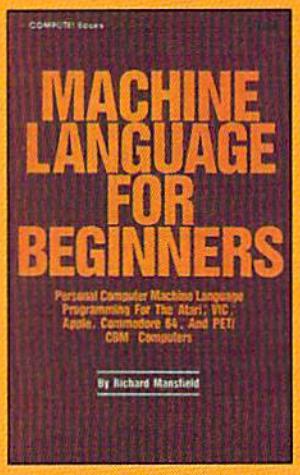
Commodore Users Group, David M. Boyter, Rt. 2, Box 278B, Boydton, VA 23917

Commodore Hilltop User Group (CHUG), Doug Stiltner, Rt. 3, Box 301-B, Cedar Bluff, VA 24609, (703) 964-9304

Capitol Area Commodore Enthusiasts (CACE), William Tyler, 607 Abbotts Lane, Falls Church, VA 22046

Commodore Users of Franklin, Bruce Powell, 1201 N. High St., Franklin, VA 23851

COMPUTE! Books brings you the companion volume to the best seller, *Machine Language for Beginners*, about which the critics have said:



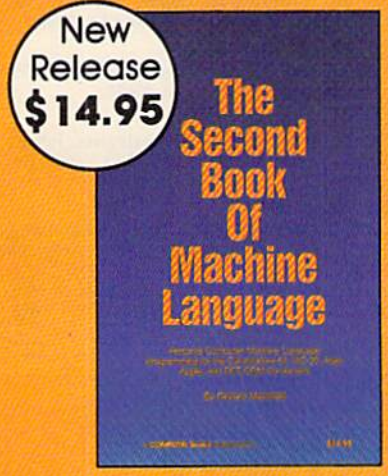
"If you know BASIC and want to learn machine language, this is the place to start . . . . Building on your experience as a BASIC programmer, Mansfield very gently takes you through the fundamentals of machine language."—Whole Earth Software Catalog

"Understandable"—The New York Times

"Presents the machine language novice with a very good tutorial in simple, understandable terms."—Antic

"I highly recommend Machine Language for Beginners as your first introduction to the world of machine language."—Commodore Power/Play

The Second Book of Machine Language for the Commodore 64, VIC-20, Apple, Atari, and PET/CBM



The Second Book of Machine Language picks up where *Machine Language for Beginners* left off. This new book contains one of the most powerful machine language assemblers currently available. The LADS assembler is a full-featured, label-based programming language which can greatly assist you in writing machine language programs quickly and easily.

It's also a clear, detailed tutorial on how large, complex machine language programs can be constructed out of manageable subprograms.

There are powerful computer languages and there is good documentation, but rarely has a sophisticated language been so completely documented as it is in this book. When you finish with this book, you'll not only have a deeper understanding of machine language—you'll also have one of the most powerful machine language assemblers available. And since everything is thoroughly explained, you can even add custom features to the assembler to create a custom language that does just what you want it to (the book shows you precisely how to modify the assembler).

For Commodore 64, Apple (II, II+, IIe, and IIc, DOS 3.3), VIC-20 (8K RAM expansion required), Atari (including XL, 40K minimum), and PET/CBM (Upgrade and 4.0 BASIC). Disk drive recommended.

15% Discount
Buy both books for **$25.00** and save **$4.90**! That's **15%** off the retail price!

Offer Expires June 30, 1985.

THE *LADS* Disk

LADS, the assembler used in *The Second Book of Machine Language*, is available on disk for only $12.95. This is a great accompaniment to the book, saving you hours of typing time by providing the complete source and object modules for all versions of the assembler. And LADS disks are specific to your Apple, Atari, or Commodore computers.

To Order: Call Toll Free **800-334-0868** (in NC **919-275-9809**) or mail this coupon with your payment to COMPUTE! Books, P.O. Box 5058, Greensboro, NC 27403. Offer Expires June 30, 1985.

_____ *The Second Book of Machine Language*, **$14.95**
_____ *Machine Language for Beginners*, **$14.95**
_____ *LADS Disk* (Apple) **$12.95**
_____ *LADS Disk* (Atari) **$12.95**
_____ *LADS Disk* (Commodore), **$12.95**

☐ Payment Enclosed (check or money order)
☐ Charge ☐ MasterCard ☐ Visa ☐ American Express

Acct. No. _____

Signature _____

Name _____

Address _____

City _____

State _____ Zip _____

_____	1 Book for	$14.95
_____	2 Books for	$25.00
_____	*LADS Disk* for	$12.95
NC residents add 4.5% sales tax		$_____
Shipping and handling ($2.00 per book $1.00 per disk)		$_____
Total Paid		$_____

All orders must be prepaid.
Please allow 4–6 weeks for delivery.

COMPUTE! Publications, Inc.
One of the ABC Publishing Companies

756111G

Fredericksburg Computer Club, Steven Northcutt, P.O. Box 1011, College Sta., Fredericksburg, VA 22402, (703) 371-4184

Central Virginia User Group C-64 and VIC 20, Dale Moore, Rt. 3 Box 451, Hurt, VA 24563, (804) 324-4054

Lynchburg User Group, Dick Rossignol, Rt. 2, Box 180, Lynchburg, VA 24501

Washington Area Commodore User Group, Richard Jackson, P.O. Box 93, Mount Vernon, VA 22121, (703) 360-6749

R.A.C.E. Commodore 64 Users Group, Larry Rackow, 4726 Horseman Drive, Roanoke, VA 24019, (703) 362-8960

WASHINGTON

Anacortes User Group, Jim Cook, 1010 5th St., Anacortes, WA 98221, (206) 293-0222

C-64 Diversity, Jill Johnston, 18204 67th Ave. NE, Arlington, WA 98223, (206) 435-4580

Commodore Computing Exchange, Phillip King, 16821 First Ave. SE, Bothell, WA 98012

Club 64, Hal Scheidt, 6735 Tracyton Blvd. NW, Bremerton, WA 98310, (206) 692-8295

CBM Users Group, Rick Beaber, 803 Euclid Way, Centralia, WA 98531, (206) 736-4085

White River Commodore 64 User's Group, Dana L. Seaney, 2649 Warner Ave. W. #69, Enumclaw, WA 98022, (206) 825-1880

Skagit Computer Users Forum (S.C.U.F.), Scott Honaker, 2909 Manito Drive, Mount Vernon, WA 98273, (206) 424-9025

Tri-Cities Commodore Computer Club (TC-3), Jack Garvin, 1926 Pine St., Richland, WA 99352, (509) 943-4734

Honeywell Commodore Users Club, Honeywell Inc. MSD, 5303 Shilshole Ave. NW, Seattle, WA 98107

NW Commodore User Group, Richard Ball, 2565 Dexter N. #203, Seattle, WA 98109, (206) 284-9417

PSACE, Ken Tong, 1800 Taylor Ave. N., Seattle, WA 98109

University 64 User Group, Allen Gown, Dept. of Path. SM-30, University of Washington, Seattle, WA 98195

Spokane Commodore User Group, c/o N. 310 Raymond, Spokane, WA 99206, (509) 928-8634

World Wide User Group (Military Personnel Only), R. Smith, P.O. Box 98682, Tacoma, WA 98498, BBS: (206) 535-0547 (7 days, 24 hours)

Central Washington Commodore User Group, P.O. Box 10937, Yakima, WA 98909

WEST VIRGINIA

The Commodore Group, Phil King, P.O. Box 2655, Clarksburg, WV 26302, (304) 842-5025

Tri-State Commodore Users Group, P.O. Box 2501, Huntington, WV 25725-2501, (304) 525-7691

Commodore Home User's Group (C.H.U.G.), Alice Shipley/John Fijalkowski, 81 Lynwood Ave., Wheeling, WV 26003, (304) 242-8362

WISCONSIN

Commodore and VIC Enthusiasts (C.A.V.E.), Mike Shaffer, P.O. Box 33, Crivitz, WI 54114, (715) 854-2269

Eau Claire Area CBM 64 User Group, John F. Slavsky, Rt.5, Box 179A, Eau Claire, WI 54701, (715) 874-5972

COMM-BAY64, Richard F. Luxton, P.O. Box 1152, Green Bay, WI 54305, (414) 336-3956

Janesville Area Commodore Users Group, Charles Williams, P.O. Box 1858, Janesville, WI 53547

S.W.I.T.C.H., Pat Gaylord, W153 N8009 Meadowland Drive, Menomonee Falls, WI 53051

Commodore Users of Systems, Software & Hardware (CUSSH), Butch Thompson, 4025 21st St., Racine, WI 53405, (414) 554-9739

Madison Area Commodore User Group, John Carvin, 3634 Swoboda Rd., Verona, WI 53562, (608) 831-6995

Waukesha Area VIC-64 Enthusiasts (WAVE), Robert Claudio, P.O. Box 641, Waukesha, WI 53186, (414) 542-1292

Commodore Hobbyists Involved In Personal Systems (CHIPS), Richard M. Kohn, 1017 Kilbourn Ave., West Bend, WI 53095, (414) 334-2494

WYOMING

ZYMEC Software & Users Group, Tim Struna, Rt. 63, Box 357, 11 Birchfield Lane, Lander, WY 82320, (307) 332-9051 or (307) 332-6644

Commodore User Groups Outside The U.S.

COMMODORE USER GROUPS OUTSIDE THE U.S.

OVERSEAS APO USER GROUP

Overseas Commodore User's Group, SFC Carroll P. Daniels, HQ 7th Medcom Box #1, APO NY 09102, 06224/71240 (5–7 p.m.)

AUSTRALIA

VICdore User's Group Beryl Bayliss, P.O. Box 1280, Inghan 4850, Queensland, Australia

Cairns Commodore User Group, Walter Kindt, P.O. Box 209, N. Cairns, Queensland 4870, Australia

BRAZIL

Associacao dos Usuarios de Micro-computadores Domesticos, Pedro Paulo Rocha, estr. da Canoa 401, 22600 Rio de Janeiro, Brazil

CANADA

Alberta

Calgary Commodore Users Group, Lloyd E. Norman, 810 Canfield Way SW, Calgary, Alberta, Canada T2W 1K1, (403) 281-2772

Commodore User Group Randy R. Coutts, Box 1584, Slave Lake, Alberta, Canada T0G 2A0

British Columbia

Cassiar Commodore Club (CCC) P.O. Box 685, Cassiar, British Columbia, Canada V0C 1E0, (604) 778-7716

Manitoba

Manitoba Users Group (M.U.G.), Mike Orloff, 41-33 Weatherstone Place, Winnipeg, Manitoba, Canada R2J 2S9, (204) 257-3346

New Brunswick

Fundy C-64 Users Group, c/o 32/A Cannon Road, Quispamsis, New Brunswick, Canada E0G 2W0

Commodore Computer Club, P.O. Box 91164, West Vancouver, British Columbia, Canada V7V 3NG, (604) 738-3311

Ontario

Barrie User Group, P.O. Box 1028, Barrie, Ontario, Canada L4M 5E1

The Brantford Hackers Syd Bolton, 25 Frontenac Ave., Brantford, Ontario, Canada N3R 3B7, (519) 753-6120

Guelph Computer Club, A. Holman, 38 Cheltonwood, Guelph, Ontario, Canada N1E 4E3

The London Commodore User Club (LCUC), Dennis Trankner, 28 Barret Cr., London, Ontario, Canada N6E 1T5, (519) 681-5059

Users Group of Mt. Forest (U.G.M.F.), Ken Hay, 597 Oakview Cresent, Box 262, Mt. Forest, Ontario, Canada N0G 2L0, (519) 323-1210

The Great White North Computer Club, T.E. Vieira, 358 Grenville St., Orillia, Ontario, Canada

Durham C64 Club, c/o Carol Schenman, 1322 Naples St., Oshawa, Ontario, Canada L1K 1J6

Tuesday User Group (TUG), Box 1787, Port Perry, Ontario, Canada L0B 1N0, (416) 985-7686 (days); (416) 985-7277 (evening)

Budget Wise Computer User Group, Dennis J. Lachance, 17 Chaplin Avenue, St. Catharines, Ontario, Canada L2R 2E4, (416) 684-9735

St. Catharines C-64 Junior Group, Rob Burtch, 32 Kilbourne St., St. Catharines, Ontario, Canada L2M 3E4, (416) 937-5652

St. Thomas Users Computer Club (S.T.U.C.C.), Neil Moore, 39 Owaissa St., St. Thomas, Ontario, Canada N5P 1T1, (519) 631-2243

St. Thomas Users Computer Club (S.T.U.C.C.), Dennis Demeester, 30 Forest Ave., St. Thomas, Ontario, Canada

Sarnia Commodore 64 User Group, Susan Timar, 1122 Wilson Dr., Sarnia, Ontario, Canada N7S 3J6, (519) 542-2534

Sault Commodore Computer Club, Jeff Kelly, 560 Old Goulais Bay Rd., Sault Ste. Marie, Ontario, Canada P6A 5K8

Toronto PET Users Group Inc. (TPUG), 1912A Avenue Rd., Suite 1, Toronto, Ontario, Canada M5M 4A1, (416) 782-9252 or (416) 782-8900

PET Educator Group (P.E.G.), John Moore, P.O. Box 454, Station A, Windsor, Ontario, Canada N9A 6L7, (519) 252-7878 BBS: (519) 977-0186

Quebec

Club Commodore Champlain, Claude Hebert, P.O. Box 522, Boucherville, Quebec, Canada J4B 6Y2, (514) 655-2269

Evaluation Club For The C-64, TRS-80, And AppleII, Steven Benoit, 7145 Cannes #2, Montreal, Quebec, Canada H1S 2P9, (514) 374-3673

Saskatchewan

Prince Albert Commodore Users Group, P.O. Box 2464, Prince Albert, Saskatchewan, Canada S6V 7G3

DENMARK

MIDTJYDSK Computer Klub (M.C.K.), Postbox 10, DK-7470 Karup J., Denmark, 06-662254 (for calls within Denmark)

ENGLAND

R.R. VIC/64 Owners Club, Tom Lomax, 17 Greystoke Drive, Bilborough, Nottingham, Nottinghamshire, England, Nottingham 289467

IRELAND

Club64, 85 Upper Drumcondra Rd., Dublin 9, Ireland

FINLAND

Helsinki Area VIC User Group, Matti Aarnio, Linnustajankj 2B7, SF-02940 ESPOO, Finland

MEXICO

Club Herra*Tec C64, Alain Bojmal, Vicente Suarez 25, 06100, Mexico, D.F.

NEW ZEALAND

East Coast Bays Commodore User Group, P.O. Box 35-034, Browns Bay, Auckland 10, New Zealand

New Zealand Commodore Users Group, Inc., P.O. Box 5223, Wellesley St., Auckland, New Zealand

Nelson Commodore User Group, Peter Archer, P.O. Box 860, Nelson, New Zealand 54/79362

PUERTO RICO

Commodore User Group of Puerto Rico, 16 St. 35-24, Villa Carolina, Puerto Rico 00630

SWEDEN

Worldwide Commodore 64 Genealogists, Johann H. Aadde, Dalkarrsleden 49, S-162 24 Vaellingby, Sweden

WEST GERMANY

Commodore Computer Users Group Heidelberg, Robert H. Jacquot, P.O. Box, Gen. Del., APO, NY 09102, 06223-5614 (Germany only)

Commodore Club, Wandel M., Joh-Machern STR. 8D, D-645 Hanau-7, West Germany

PRINT T-SHIRTS ON YOUR COMPUTER!

With the UNDERWARE RIBBON™ your printer makes dozens of iron-on transfers. Print any image on plain paper, then iron it onto your own T-Shirt! Make T-Shirts for friends or as gifts. Available for the Apple Imagewriter, IBM, Epson, Okidata and Star Gemini dot matrix printers.

Add five colors to any UNDERWARE RIBBON transfer with new UNDERWARE COLOR-PENS™

Suggested retail for the UNDERWARE RIBBON and UNDERWARE COLORPENS is $19.95 each.

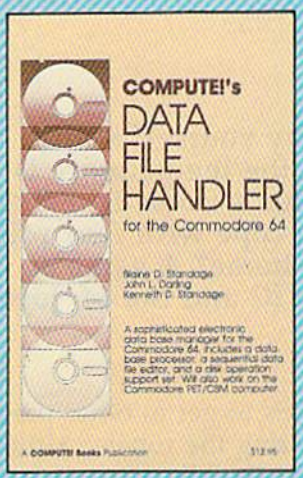
See your dealer or contact:

UNDERWARE RIBBON

Diversions, Inc.
1550 Winding Way
Belmont, CA 94002
(415) 591-0660

COMPUTE! BOOKS

Look for these new titles for your Commodore.


COMPUTE!'s
DATA
FILE
HANDLER
for the Commodore 64
Blaine D. Standage
John L. Darling
Kenneth D. Standage
A sophisticated electronic data base manager for the Commodore 64. Includes a data base processor, a sequential data file editor, and a disk operation support set. Will also work on the Commodore PET/CBM computer.
A COMPUTE! Books Publication
$12.95

COMPUTE!'s Data File Handler for the Commodore 64

Blaine D. Standage, John L. Darling, Kenneth D. Standage

Data File Handler is a series of integrated programs that give the user a database processor, a sequential data file editor, and a disk operation support set. The book consists of all the necessary program listings and documentation to use this powerful database management system. Few computer programs are as well-explained or as cost-effective as this one. Anyone who wants an effective information management system for their Commodore 64 or PET/CBM will find this an extraordinary software/documentation package.

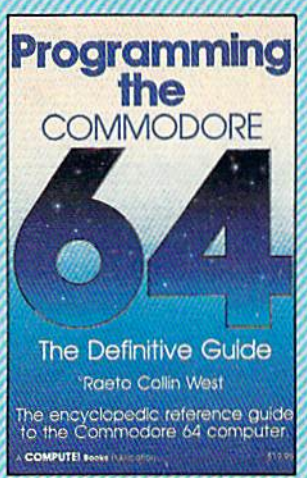
$12.95

ISBN 0-942386-86-8

Programming the Commodore 64: The Definitive Guide

Raeto Collin West

Programming the Commodore 64 is an encyclopedic, thorough reference guide to the Commodore 64. In the tradition of the renowned *Programming the PET/CBM*, author Raeto Collin West has compiled 17 definitive chapters which cover this computer in its entirety. There are dictionaries, maps, BASIC and machine language examples, and programming aids. Unlike many computer books, which can be read once and discarded, *Programming the 64* will remain valuable for the life of the computer. It starts with BASIC and probes more deeply with each chapter. Ready-to-type programs show how to use the BASIC and Kernal ROMs; the 6502 microprocessor; the CIA, VIC, and SID chips; and the hidden RAM beneath the ROM in the 64. And major peripherals—tape and disk drives, printers, plotters and modems—are also discussed at length.



$19.95

ISBN 0-942386-50-7

To order, call toll-free **1-800-334-0868** or mail your payment (including $2.00 per book for shipping and handling charges) to COMPUTE! Books, P.O. Box 5058, Greensboro, NC 27403.

COMPUTE! Publications, Inc.
One of the ABC Publishing Companies
324 W. Wendover Avenue, Suite 200, Greensboro, NC 27408, 919-275-9809
Publishers of COMPUTE!, COMPUTE!'s Gazette, COMPUTE!'s Gazette Disk, COMPUTE! Books, and COMPUTE!'s Apple Applications.

The Freeze Factory

Clarence Din

It's bad enough working late by yourself at this unusual research plant where the temperature is always below freezing. But what's worse is trying to leave and finding you have to cope with four robots gone amok. Will you ever get home? A game of survival for the unexpanded VIC and the 64. Joystick required.

It's almost midnight at the Cybernetics Research and Development Plant, also known as "The Freeze Factory" for the constant bone-chilling temperature required for specialized robotic research. You've been working overtime on a project, but the cold is getting to you. Time to go home. One last check to make sure the power stations are off, but wait...what's moving around back there?

Mindless Menaces

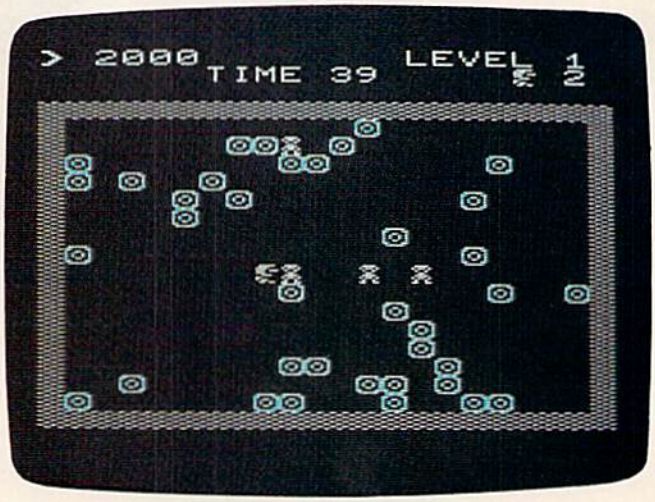
The Freeze Factory pits you, the overworked researcher, against four robots that have apparently been activated by a power surge. They wander the floor of the factory in search of heat, and the only heat source is you. You can't destroy the robots, but they can destroy you by draining your oxygen supply. But all's not lost. You can survive with a little wit and strategy.

Playing For Time

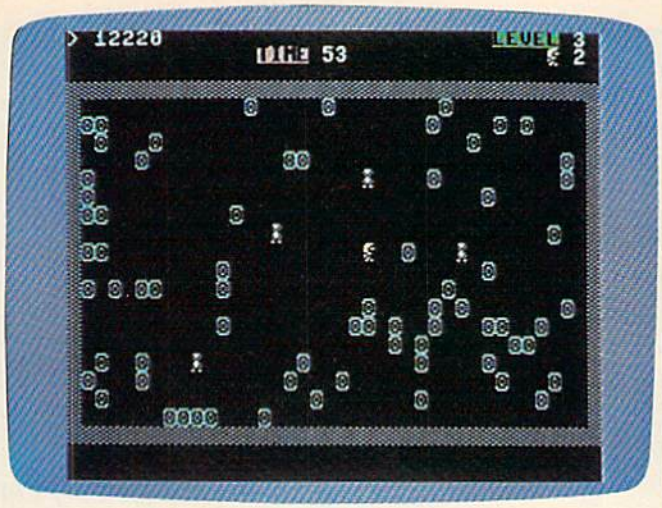
The object of the game is to survive as long as possible. Or you can play for high score. Littered about the factory are solid ice cubes, used regularly by the research team. These cubes are your only means of defense. You can temporarily "freeze" any of the robots by sliding an ice cube in their direction. On contact, they'll freeze, but unfortunately, they thaw a second later. You also have to avoid them (remember—they're semi-intelligent and they'll pursue you if they see you). Using a joystick (port 2 on the 64), move to a side of the cube and aim the joystick in the direction you want to send the cube (no need to press the fire button). Your strategy should include moving cubes to get to other parts of the playfield and freezing the robots. Although it's very difficult, it is possible to box in a robot by strategically placing cubes around it.

Scoring

If you stand against two adjacent ice cubes and move the one closest to you, the first cube is crushed (it disappears) and ten points are added to your score. One-thousand points are awarded for freezing a robot. For every four you freeze, you advance one level, gain a point bonus (the remaining time plus the number of cubes left on the playfield), and gain an extra life. Also, with any level change, new cubes are randomly positioned and the clock is reset to run at a faster pace. Twenty-five points are given for each cube left on the playfield.



Confronting a robot (VIC version).



A smart and fast move is in order (64 version).

You begin with three lives. The game ends when you've used all your lives or when the clock reaches zero.

If you'd rather not type in the program (VIC version only), send a blank cassette, a self-addressed stamped envelope mailer, and $3 to:

Clarence Din
60-Bay 28th Street
Brooklyn, NY 11214

See program listings on page 138.

You're invited to the biggest party at Valley Forge since George brought the boys!

M.A.R.C.A.

The biggest Commodore User Fair in the US.

July 26, 27, 28

Valley Forge Convention Center, Valley Forge PA

• Speakers! • Seminars! • Hanging out!
• Fun! • Vendors! • Great Buys!
• Social Events! • Fun!
Areas Tours available.

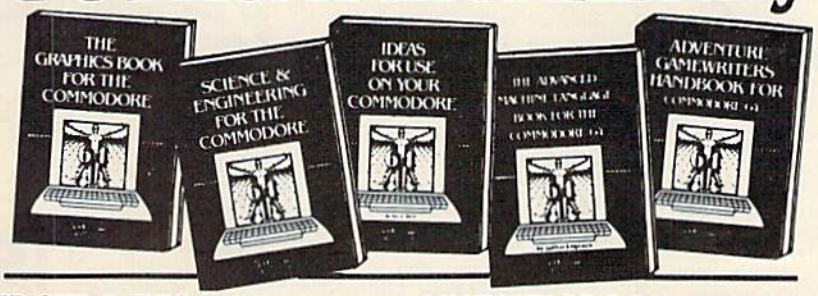
Meet the names you've only read about. Jim Butterfield. Dick Immers. Len Lindsey. Many, many more! Ask the questions you need answers to. Have 2½ days of non-stop Commodore fun! Bring the whole family. Lots to do. See. And buy. Bargains galore!

Pre-registration by July 1: 2½ days $25 M.A.R.C.A. Members $15 Family Rates available.

For pre-registration information: M.A.R.C.A., P.O. Box 1902, Martinsburg, West VA 25401.

DON'T MISS THE PARTY!

C-64 Reference Library


THE GRAPHICS BOOK FOR THE COMMODORE
SCIENCE & ENGINEERING FOR THE COMMODORE
IDEAS FOR USE ON YOUR COMMODORE
ADVENTURE GAMEWRITERS HANDBOOK FOR

TRICKS & TIPS Treasury of programming techniques. Advanced graphics, easy input, enhanced BASIC/COM, character sets, more. **275 pages $19.95**

GRAPHICS BOOK Basic to advanced, best reference available. Sprite animation, Hires, Multicolor, lightpen, IRQ, 3D graphics. **350 pages $19.95**

SCIENCE & ENGINEERING Topics from chemistry, physics, biology, math, astronomy, electronics. **350 pages $19.95**

MACHINE LANGUAGE Learn 6510 instructions. Listings for Assembler, Monitor, Simulator **210 pages $14.95**

ANATOMY OF C-64 Insider's guide to the '64 internals. Graphics, sound, I/O, kernal, more. Complete commented ROM listings. **300 pages $19.95**

PEEKS & POKES Programming quickies that will simply amaze you. This guide is packed full of techniques for the BASIC programmer. **200 pages $14.95**

ANATOMY OF 1541 DISK DRIVE Bestselling handbook on floppy disk. Explains disk files with examples and utilities. Includes complete commented 1541 ROM listings. **320 pages $19.95**

ADVANCED MACHINE LANGUAGE Video controller, interrupts, timers, clock, I/O, extended BASIC. **210 pages $14.95**

Other titles available. Phone for name of nearest dealer Phone: (616) 241-5510
Postage & handling $4.00 ($8.00 foreign). Money order, checks, VISA, MC, AMEX. Michigan residents (incl. 4% sales tax).
CANADA: Book Center, Montreal (514) 332-4154

You Can Count On **Abacus Software**

P.O. Box 7211 Grand Rapids, MI 49510 - Telex 709-101 - Phone 616/241-5510

Easy Guitar

Learn to play guitar on your Commodore 64 Computer

Now you can enjoy learning at your own pace, on your own time. EASY GUITAR puts you in tune with today's music.

Here are just a few of the fun and educational features you'll find in EASY GUITAR:

- Simple to follow, step-by-step instructions
- Reference tones for tuning your guitar
- An exercise to develop your sense of pitch
- A built-in rhythm section (bass and drums) for you to play along with
- More than 50 chord diagrams with fingering positions colorfully displayed
- Audio guidance so you know if you are playing correctly
- An adjustable metronome for developing solid rhythm
- A simplified approach to music theory and chord structure to aid you in playing and writing your own songs
- Scales to develop rapid fingering
- A multiple choice quiz (because learning can't be all fun)
- Plus a special bonus: a video game called "Catch a Chord"

$29.95 on disk
plus $1.00 shipping & handling
VISA & MC Accepted or send check or money order to:

PJ SOFTWARE
10636 Main St., #414 • Bellevue, WA 98004 • (206) 883-9257

Slik Load

$29.95

Slik Load is a Kartridge for the C-64.
Slik Load is the most reliable, effective and thought out Kartridge of it's kind.
The options include:

- **5 times faster load**
- **Eliminates drive rattle when errors are encountered.**
- **Old and un-new Will restore a basic program**
- **Status key will give you information on device number, bytes free and status of the drive.**
- **Silk Load is also fully compatible with the 1541 Super Rom**

$19.95

DMS-Errors 20, 21, 22, 23, 27 & 29 Format Single Tracks Read Disk Errors
½ Track Reader-read and select ½ track
½ Track Formatter-Format a disk with ½ tracks. This is where the next protection schemes are coming from.
Drive Mon-Disk Drive assembler/disassembler. For your 1541.
The Doc-Disk Doctor that reads code under errors.
Sync Maker-Place a sync mark on **any** track out to 41. Also used for protection.
Sync Reader-Check for Sync bits on **any** track out to 41.
Change Drive No.-Changes drive number (7-30).
Disk Logger-Finds starting track sector; start and end addresses.
Disk Match-Compare any two diskettes. Byte for byte.
New Wedge-Easier to use DOS wedge.
ID Check-Check ID's on **any** track.
Unscratch-Restore a scratched file.
View-BAM-Visual display of the free and used sectors on a diskette.
Read/Write Test-1541 performance test.
Repair a Track-Repair a track with checksum errors. Reads code under errors and restores track.
Fast Format-Format a disk in just 10 seconds (with verify!).

This is the only utility of its kind. It even has a 3 min. copy on it.

WAR GAMES AUTODIALER

1-**Auto Dial** will automatically dial a set of numbers you choose.
2-**Review Numbers** will review numbers that were answered by a computer.
3-**Save Numbers** will save numbers where a computer answered.
4-**Hardcopy of Numbers** will print out list of numbers where a computer answered.
5-**LOAD Numbers** will load in numbers to continue where it left off.
6-**Continue** will pick up dialing where it was interrupted.

$29.95

KARTRIDGE KRACKER

NOW you can own this unique and powerful tool which will allow you to dump the contents of 8K and 16K cartridges onto disk! But what's really great is that you can also RUN the cartridges programs without plugging in the cartridge! the KRACKER gets YOU INSIDE the cartridge! Put all your favorites on disk and get rid of the clutter. This package provides your with the software and hardware needed to get started. Program on disk included. (Some cartridges require use of external RAM not included)

$44.95

SOFTWARE PROTECTION HANDBOOK

3rd Edition

THIRD EDITION! NOW AVAILABLE!

If you're **tired** of being harassed by **protected software** and too many **copy** programs, then this is the book for you! This 224 page manual covers the gambit from legalities to protection methods to step-by-step back up procedures. Now you can learn both how to protect and unprotect software! The techniques covered include copying cartridges to tape or disk, tape protection, and disk protection. Disk protection covers errors 20, 21, 22, 23, 27 and 29 **plus** single track formatting, header modification, heads, swapping, half track reading and writing, reading and writing modified bit densities, formatting illegal tracks/sectors, sync writing and more! The Third edition **explains**, tells how to **detect** and how to **write** them with included software. Eleven useful utilities and many protection listings! Our disk analysis programs reveal the protection methods used on your originals. A diskette with all software is available for a minimum extra charge. This may not be the only book you should have for the C-64, but it is certainly **the one** book you should not be **without!**

C64 Book only	$19.95 US
Book & Disk of all programs	$29.95 US
Vic 20 book . . . Cart. & Tapes only	$9.95 US

THIS MANUAL DOES NOT CONDONE PIRACY

*SHIPPING: $2.00

TOP SECRET STUFF II

All C128 Compatible

Split Screens (Horizontally)	Protect Scheme For Your Disks
Smooth Scrolling	Write Protect Disk
Save Ram From Under Roms	Unwrite Protect Disk
No Drive Rattle On Errors	Mini D.O.S. Wedge
Triple Drive Head Speed	Fast Diskmatcher
Autoboot Maker	Data Statement Maker
Koala Screen DUmp	Unnew
Display GCR	3 Minute Copy
Fast Disk Eraser	D.M.S.

If you have TSS#1, You'll Like This One! All on one disk **$19.95**

Bulletin Board

Set up and operate your own bulletin board with one or two disk drives. This one has all the features and you can customize it easily yourself.

1-RUN MEGASOFT-BBS	8-READ SYSOP MESSAGES
2-CREATE MEGA FILES	9—WRITE OPENING MESSAGE
3-ADD TO SYSOP'S CORNER	10-READ LOG
4-NEW SYSOP'S CORNER	11-CYCLE LOG
5-READ MESSAGES	12-READ DOWNLOAD FILE
6-SCRATCH MESSAGE	13-SCRATCH DOWNLOAD FILE
7-CYCLE MESSAGES	14-ADD TO OTHER SYSTEMS
	15-CREATE OTHER SYSTEMS

$59.95

BBS

- Leveled Access
- Private Message Base
- Up to 300 Passwords
- Expert Mode
- Open Chalk Board for Highest Level Access

Enclose Cashiers Check, Money Order, or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders. Canada orders must be in U.S. Dollars. VISA — MASTER CARD — C.O.D.

Programs for C-64 $2.00 S & H on all orders

Software Submissions Invited.

MegaSoft Limited

P.O. Box 1080, Battle Ground, Washington 98604

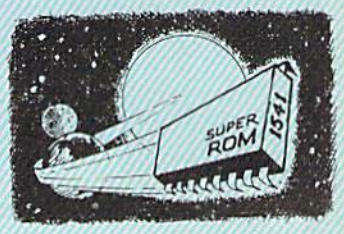
Phone (206) 687-5116 • BBS 687-5205 After Hours Computer to Computer

D-Compiler $59.95

The first D-Compiler to give you back your source code *after* your program has been compiled with *Blitz.

*Blitz is a trademark of Skyles Electric Works

1541 Super ROM $39.95



- *Fast Save Load Verify*
- *Fast Scratch and Validate*
- *10 Second Format with Verify*
- *No more Drive Head rattling during Format or Error Reading*
- *also Save with Replace is Improved*
- *Two times faster, Eight times faster when used with Turbo 64 which is included*
- *1541 Super ROM is 100% Compatible*
- *Easily installed in Minutes*

APALLO COPIES IT ALL

APALLO Does it All. This program is the latest generation of copy programs. It will do everything the $39.00 and $49.00 programs will do and **more.** It Copies **ALL** drive errors, bad tracks and sectors, non-standard format, bad syncs, and half tracks. We feel this is the best program of its kind available...

$29.95

MSD Sure Copy

At last a complete utility package for the MSD Dual Drive. ***This is the first MSD utility program that does it all.*** *The main menu options include:*

- *Copy Protected Disk*
- *Copy Files*
- *Format a Disk*
- *Change Disk Name*
- *Quit*
- *Copy Unprotected Disk*
- *Scratch a File*
- *Rename a File*
- *View Directory*

$39.95

Sure Copy *will put all errors automatically on disk: 20, 21, 22, 23, 27 and 29's.*

D-CODER

- Translates any machine language program into easy-to-read English descriptions with complete explanations of each command!
- Makes complete notations of all important memory locations accessed by the program! (SID, VIC, MOS, KERNAL, etc.)
- Gives you three ways of accessing programs:
  1) **Will read and list programs from DISK**
  2) **Will read and list programs from MEMORY!**
  3) **Direct user input** (from magazines, etc.)
- Can be used to locate and examine any machine language program's protection routines!
- Can be used to easily break apart machine language programs for study and examination!
- Printer option for complete hard copy listings!

$19.95

You no longer need to be an EGGHEAD to read Machine Language.

N-CODER $19.95

the machine language manipulator...

The perfect companion program to D-CODER!

Allows you to easily make changes in machine language programs... right on the disk!

- *Rewrite ability allows code to be altered and then rewritten directly to the disk!*
- *Features sector-by-sector scrolling assembly language display of machine language programs!*
- *Notation of ASCII text equibalents for easy spotting of embedded text strings!*
- *Handy reference display of all assembly language commands and their ML numerical equivelents!*
- *Byte splitter for easy splitting of decimal addresses into low byte-high byte format!*

Super Loader

Super Loader is a Kartridge that plugs into your expansion port, that allows the computor, on power up start the disk drive and load the first preselected program on the disk.

- Change colors
- Load wedge
- Works with more drive
- Takes up no memory
- Reset switch included

Only **$29.95**

TOOL BOX

This Disk has over 100 routines, some of them are routines for protection, smooth scrooling, modem routines, and sound and color routines. They can easily be incorporated into all of your programs. It is also fully documented.

$19.95

Squares

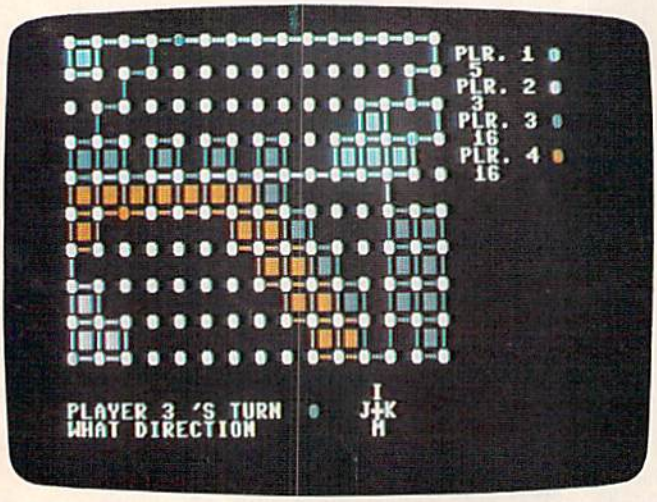
Douglas Fish

Teach your snake well: It will remember each move you make as you try to conquer the board with your squares. A strategy game for one to four players. For the Commodore 64.

At first glance, "Squares" looks a lot like "Dots," the paper and pencil game where opponents take turns connecting dots to try and complete squares. And, as in the paper game, the basic objective is to complete more squares than your opponents. But the similarities end there—in Squares, the dots are connected by an intelligent "snake," which you control.

After loading and running Squares you are asked if each of the four snakes will be player controlled or computer controlled. Moves for the player controlled snakes are entered via the keyboard; the computer snakes move around semi-randomly.

You can move your snake up, down, left, or right by pressing the I, M, J, or K keys respectively (as a reminder, the directions are printed on the screen during the game). When you move your snake between two dots, it leaves a trail in the color of your player.



Players 3 and 4 are tied for the lead, but orange (player 4) is caught in a loop.

With each move you make, you "train" your snake to move in a certain way, depending on the pattern of trails around it. For example, say there are trails to the left of and below your snake, and you move it up. From then on, whenever your snake encounters a pattern in which there are trails to the left and below it, it will move up.

If the snake encounters a pattern it hasn't learned yet, as when you first start the game, it will ask you for a direction. Again, the direction you choose will train the snake for that pattern.

Trapped Snakes

A snake can become trapped, though, if you give it an instruction which forms a loop with a previous instruction. For instance, say you tell it to go right, but when it moves right it enters a pattern where it has been instructed to move left. It then becomes trapped between those two instructions. A trapped snake can be released later, however, if the pattern it's in is changed by another snake.

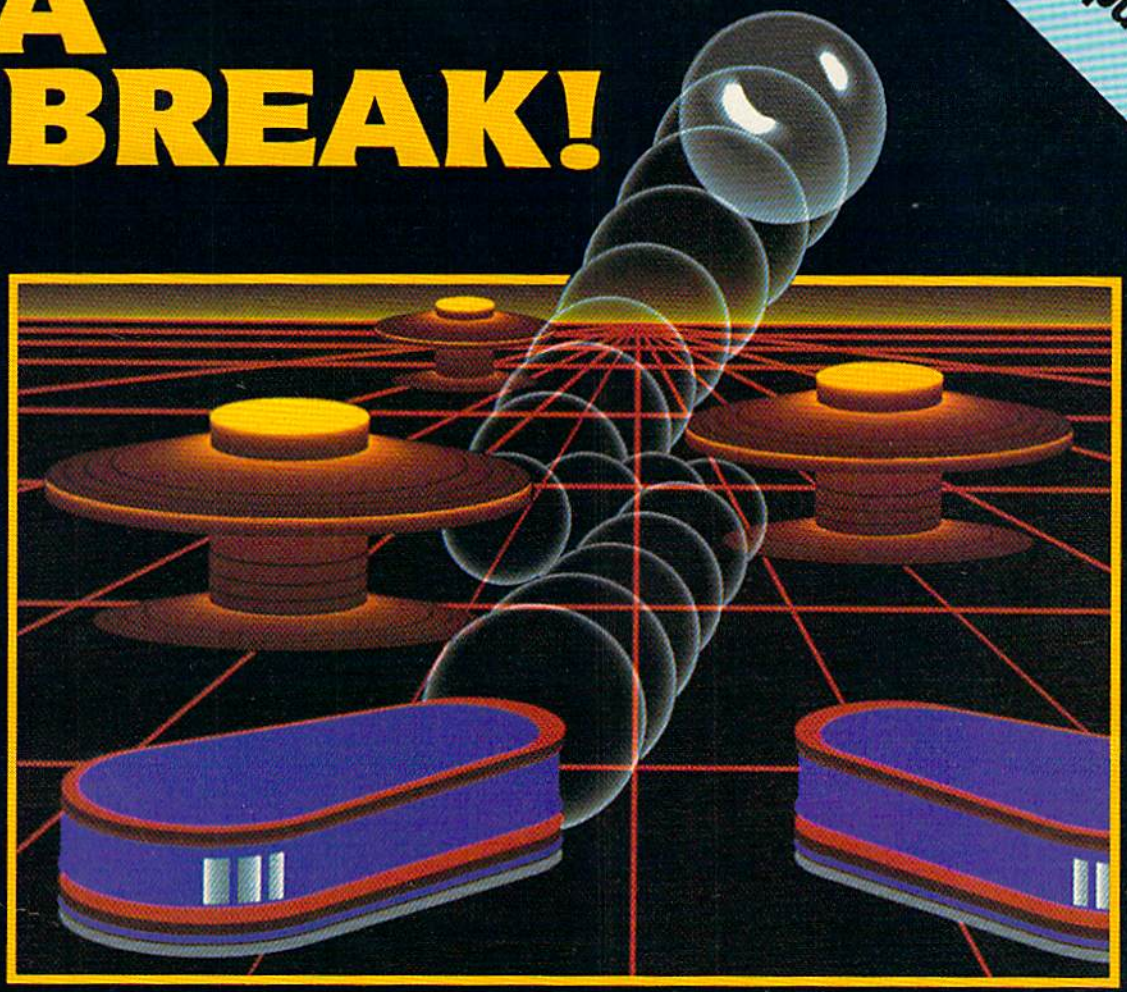
When your snake completes a square, it fills in with your color, and you earn a point. The game is over when all of the squares are filled or all of the snakes are trapped. Whoever completes the most squares wins the game.

There are a number of strategies you can develop for conquering long rows of squares or avoiding getting trapped. You may find, though, that it's difficult to remember how your snake has been trained for each possible pattern of trails. Also, each game that you play will be unique, so what works for one game may get you trapped early on in the next. Usually, it's a combination of strategy and chance that wins the game.

See program listing on page 133.

TAKE A BREAK!

For Commodore 64™ Computers



WITH NIGHT MISSION PINBALL

You deserve the best. You've earned it. Now reward yourself with a session of **Night Mission PINBALL**, the most realistic and challenging arcade simulation ever conceived! ■ Stunning graphics and dazzling sound effects put **Night Mission PINBALL** in a class by itself. Game features: multi-ball and multi-player capabilities, ten different professionally designed levels of play, and an editor that lets you create *your own* custom modes. ■ So take a break with **Night Mission PINBALL** from SubLOGIC. Winner of *Electronic Games* magazine's 1983 Arcade Award for Best Computer Audio/Visual Effects.

See your dealer . . .

or write or call for more information.

Order Line: 800 / 637-4983

subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

Real World Software

Part 2: A Survey Of Recent And Upcoming Products

Fred D'Ignazio, Associate Editor

What Is Real World Software?

Last month I introduced the concept of real world software: programs that give an immediate, direct, tangible, and visible benefit to a person's daily life.

This month, we'll look at 106 products for the Commodore 64 that most closely resemble my definition of real world software. After we look at programs now available, I'll tell you my "wish list" for real world software I'd like to see on the Commodore 64.

Biology And Medicine

The Body Transparent (DesignWare) is a variation of the popular "Visible Man" and "Visible Woman" kits. *Creature Creator* (DesignWare) and *Mail Order Monsters* (Electronic Arts) let you play Dr. Frankenstein and assemble your own monsters from different body parts. *Fantastic Animals* (Bantam) and *Operation: Frog* (Scholastic) let you build real animals. *The Incredible Laboratory* (Sunburst) is a monster-building chemistry set.

These programs qualify as real world software because some of them teach anatomy, physiology, and biology; and because all of them teach valuable logic and problem-solving skills children can apply to other areas of their lives.

College Success

This is one of the most obvious real world categories. My choices are *Mastering The SAT* (CBS), *SAT Exam Preparation* and *ACT Exam Preparation* (Krell), *The Perfect Score: SAT Preparation* (Mindscape), and *Lovejoy's SAT & College Preparation Guide* (Simon & Schuster). Studies show that these programs have a direct real-world effect: They help students improve their scores on college aptitude and achievement exams.

Communication

This category includes programs people use as communication tools. All of them are "productivity tools," but I chose them because they're intended primarily for children and other beginning computer users, and because they combine the power of a valuable tool with ease of use. Also, they open up new ways for people to communicate with one another.

SkiWriter II (Prentice-Hall) lets you compose letters and easily send them over the telephone to another person as electronic mail. Penguin's *Graphics Magician* lets you create electronic greeting cards. *Bank Street Writer* (Brøderbund), *Cut & Paste Word Processor* (Electronic Arts), *Mastertype's Writing Wizard* (Scarborough), and Sierra's *Homeword* (with *Homeword Speller)* are excellent, easy-to-use word processors. I also highly recommend *Easy Graph* (Grolier) and Scholastic's *PFS:Report* and *PFS:Write*.

Communication Success

These software packages teach reading, writing, and typing skills. *MasterType* (Scarborough) and *Typing Tutor III* (Simon & Schuster) teach typing. *Magic Spells* (Learning Company) and *Reader Rabbit* (Learning Company) improve young children's vocabulary and reading ability. *Reading Professor* (Commodore) and *The Devil & Mr. Webster* (Krell) teach reading skills to older children and adults. *Grammar Examiner* (DesignWare) and *Grammar, What Big Teeth You Have* (Krell) teach writing and language arts skills to children ages ten and up. And *Welcome Aboard* (Brøderbund) uses Muppets to teach computer literacy.

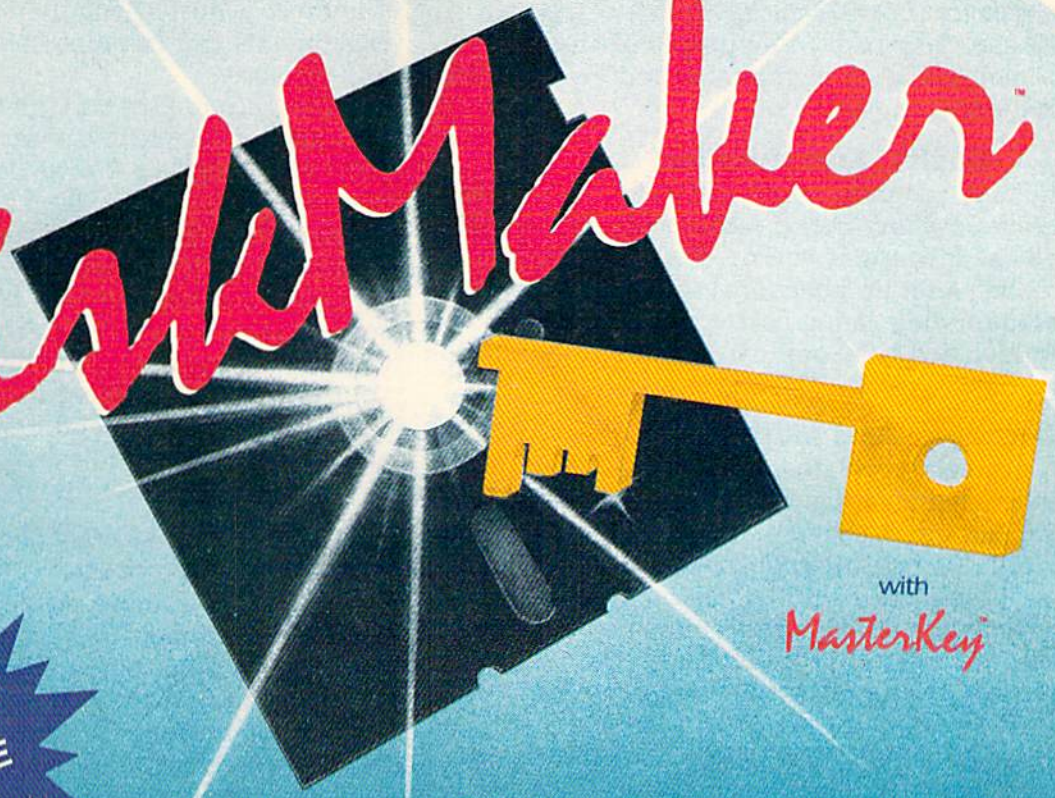
Crafts

The only program in this category, *Mask Parade* (Springboard), enables children to design and print out their own paper "dress-up" costume, including a hat, face, jewelry and accessories, and feet. They can then color it with paint, crayon, or Magic Marker, and assemble it with glue or string.

BEFORE LOADING YOUR SOFTWARE
MAKE A BACKUP COPY WITH

NEW! Version 2.2

DiskMaker™



with MasterKey

99% EFFECTIVE

THE AUTOMATIC DISK BACKUP SYSTEM FOR YOUR 64 & 1541 DRIVE!

- Uses NEW Vari-sector track scanning process
- Actually copies a FULL disk in only 3 MINUTES!
- Easiest to use—TOTALLY automatic copy utility
- NEW Auto-Sensor detects and copies half-tracks
- Breaks through LATEST protection schemes
- 3 copiers in 1! Includes FAST Copier, VARI-SECTOR Copier, and HALF-TRACK Nibbler
- Copies normal & HALF-TRACKS up to track 40
- NEW sync-seeking logic reduces copy time
- 100% machine code for fast, RELIABLE operation
- NO analysis required, just swap disks...& NO damaging drive knock during errors, format, or copying
- Detects & DUPLICATES extra sectors, hidden ID's, altered headers, frequency & track density
- All copiers AUTOMATICALLY put "errors" on backup
- UNLOCKS protected disks for backup copying
- FASTEST & most advanced backup copier you can buy
- Writes errors 20, 21, 22, 23, 27, 29 WHILE COPYING!
- Transforms your 1541 into a SUPER-FAST copy drive!
- PRODUCT SUPPORT tel. #, revisions, and upgrades

UP TO 4 TIMES FASTER THAN OTHER COPIERS!

ONLY **$49.95** for entire system

To order CALL **805-687-1541 ext. 64**
Technical line 805-682-4000 ext. 99

MasterCard VISA AMERICAN EXPRESS

Order by phone 24 hrs./7 days or send cashier's check/money order payable to BASIX. Visa, MasterCard & American Express include card # and exp. date. CA residents add 6% tax. Allow 2 weeks for clearance of personal and co. checks. Add $3.50 shipping/handling for continental U.S.; $5.50 for UPS air. COD's shipped to 48 states only, add $4.00. AK, HI, APO, FPO, add $7.50. CANADA add $10.00. Other Foreign orders add $15.00, and remit certified U.S. funds only. No credit card orders from outside North America. Dealers & Distributors invited & supported.

DISKMAKER PAYS FOR ITSELF THE FIRST TIME YOU USE IT!

basix

© 1985

3463 State Street • Suite 154A • Santa Barbara • CA 93105

Dance/Exercise

These programs—*Dance Fantasy* (Fisher-Price), *Breakdance* (Epyx), *Dancing Bear* (Koala), and *Aerobics* (Spinnaker)—let people of all ages choreograph their own dances and exercises and set them to music.

Diet, Health, And Nutrition

The only program in this category, *The Original Boston Computer Diet* (Scarborough), is appealing because it counsels you on diet and nutrition, and helps set up a personal weight-loss regimen based on diet, eating habits, moods, and behavior. Included is a book with readings on nutrition and diet.

Geography And Map-Reading

This category contains programs that teach with challenging games and adventure scenarios. Children can travel through outer space with Mickey Mouse (*Mickey's Space Adventure* from Sierra) and Winnie the Pooh (*Winnie the Pooh in the Hundred Acre Wood*, also from Sierra). *America Coast to Coast* (CBS) features a special plastic keyboard overlay that enhances game play.

Road Rally USA (Bantam) challenges children to map their way from point to point across the U.S. while overcoming hazards and obstacles. And *States & Traits* and *European Nations & Locations* (DesignWare) enables parents and children to make their own lessons on U.S. and European geography.

Hobby

The only program in this category, *Charles Goren: Learning Bridge Made Easy* (CBS) teaches an older child or adult how to play bridge.

Invention And World Builders

These two categories feature open-ended "mad scientist's laboratories" that encourage you to experiment. *Pinball Construction Set* (Electronic Arts) lets you create a pinball machine that operates under new laws of physics. *Rocky's Boots* (The Learning Company) lets you build electronic circuits out of logic gates. In *Chem Lab* (Simon & Schuster) you get to perform over 50 experiments and combine chemicals a thousand different ways.

The Factory (Sunburst) lets you build your own factory. In *Racing Destruction Set* (Electronic Arts) you design your own slot cars, then test your designs by racing them. In *The Great Gonzo in Word Rider* (Simon & Schuster) you help Gonzo the muppet rescue his favorite chicken, Camilla, by using "power words" to construct all sorts of marvelous vehicles to find Camilla. In *Creative Contraptions* (Bantam) you get to build your own Rube Goldberg machines. *Dream House* (CBS) lets you design and build your own house; and *Kids at Work* (Scholastic) lets you be architect and construction crew foreman.

Math Success, Money Management, And Professional Success

The programs in these categories teach math, money management, decision-making, problem-solving, and other practical skills. Many of the programs do this by handing you a tough but exciting job and saying, "Here, you handle this!" But they're not without lots of helpful hints and clues from the programs.

I selected the four Math Success programs because they contained several real world software features. For example, *Success with Math* (CBS) is really a *curriculum* of math programs, each sold separately for $24.95. The programs are for adults and children ages six and up.

Math/Spelling Teacher (CompuTech) offers excellent feedback on how well you're learning math and spelling. It takes a pedagogically sound, step-by-step approach to teaching math concepts and better spelling habits.

Mission: Algebra (DesignWare) is included because, for the first time, I saw some use to learning algebra. I was set down in an interstellar spaceship and told to rescue a stranded ship. To

Companies That Publish Real World Software For The Commodore 64

Alfred Publishing
15335 Morrison Street
Sherman Oaks, CA 91403
(818) 995-8811

Bantam Electronic Publishing
666 Fifth Avenue
New York, NY 10103
(212) 554-9822

Brøderbund
17 Paul Drive
San Rafael, CA 94903-2101
(415) 479-1170

CBS Software
One Fawcett Place
Greenwich, CT 06836
(203) 622-2673

Commodore
1200 Wilson Drive
West Chester, PA 19380
(215) 431-9100

CompuTech
P.O. Box 7000-309
Redondo Beach, CA 90277
(213) 375-6391

DesignWare
185 Berry Street
San Francisco, CA 94107
(415) 546-1866

Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171

Epyx, Inc.
1043 Kiel Court
Sunnyvale, CA 94089
(408) 745-0700

Fisher-Price
One Kendall Square
Cambridge, MA 02139
(617) 494-1200

Groller Electronic Publishing
95 Madison Ave.
New York, NY 10016
(212) 696-9750

Koala Technologies
2065 Junction Avenue
San Jose, CA 95131-2105
(408) 946-4483

Krell
1320 Stony Brook Road
Stony Brook, NY 11790
(800) 245-7355

Mindscape
3444 Dundee Road
Northbrook, IL 60062
(312) 480-7667

Penguin Software
P.O. Box 311
Geneva, IL 60134
(312) 232-1984

Prentice-Hall
P.O. Box 819
Englewood Cliffs NJ 07632
(201) 592-2641

Scarborough Systems
25 North Broadway
Tarrytown, NY 10591
(914) 332-4545

Scholastic
730 Broadway
New York, NY 10003
(212) 505-3497

Sierra On-Line
Sierra On-Line Building
Coarsegold, CA 93614
(209) 683-6858

Simon & Schuster
1230 Ave. of the Americas
New York, NY 10020
(212) 245-6400

Spinnaker Software
One Kendall Square
Cambridge, MA 02139
(617) 494-1200

Springboard
7807 Creekridge Circle
Minneapolis, MN 55435
(612) 944-3912

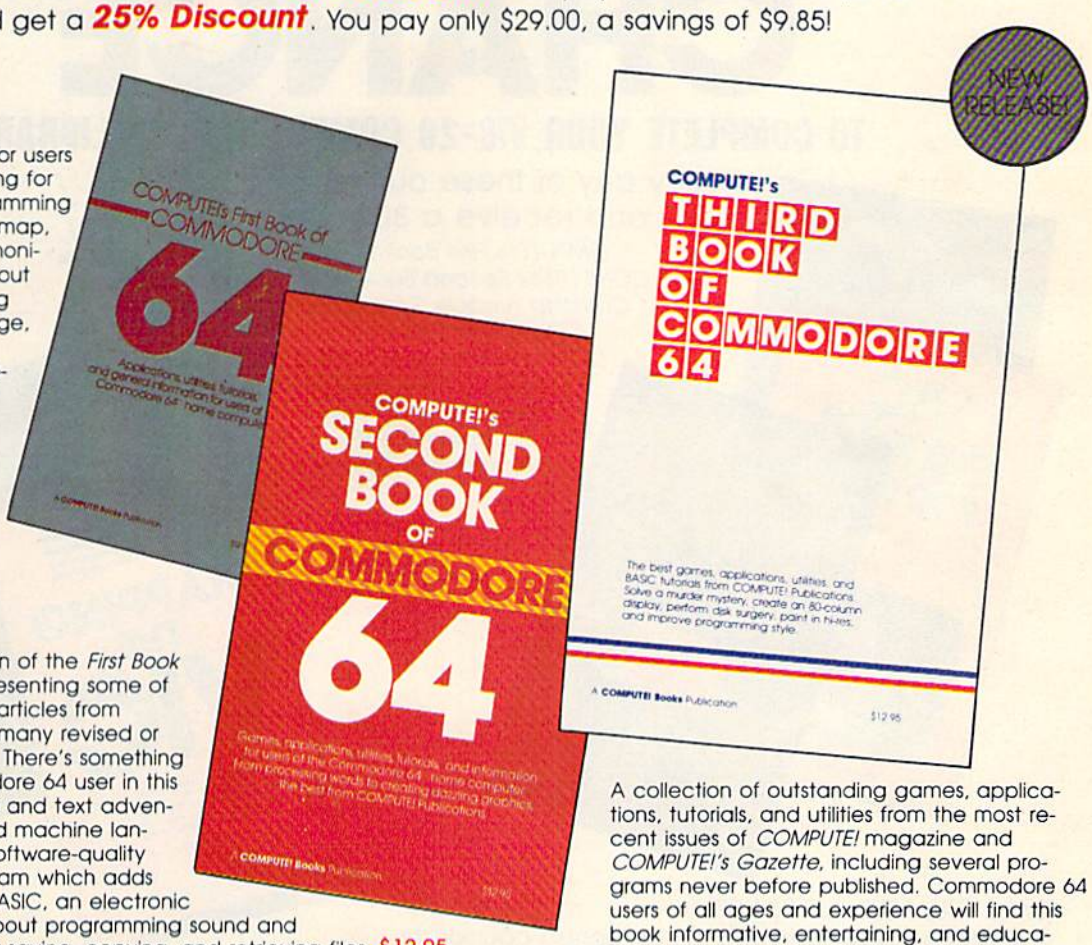
Sunburst Communications
39 Washington Avenue
Pleasantville, NY 10570
(800) 431-1934

The Learning Company
545 Middlefield Road
Menlo Park, CA 94025
(415) 328-5410

A *SPECIAL OFFER* from COMPUTE! Books

for Owners and Users of Commodore Computers

Buy any 2 of these books and receive a ***15% Discount***. You pay $22.00 and save $3.90!
Buy all 3 books and get a ***25% Discount***. You pay only $29.00, a savings of $9.85!


COMPUTE!'s First Book of COMMODORE 64
COMPUTE!'s SECOND BOOK OF COMMODORE 64
NEW RELEASE!
COMPUTE!'s THIRD BOOK OF COMMODORE 64
The best games, applications, utilities, and BASIC tutorials from COMPUTE! Publications. Solve a murder mystery, create an 80-column display, perform disk surgery, paint in hi-res, and improve programming style.
A COMPUTE! Books Publication
$12.95

An excellent resource for users of the 64, with something for everyone: BASIC programming techniques, a memory map, a machine language monitor, and information about writing games and using peripherals. This 264-page, spiral-bound book includes many ready-to-type-in programs and games. $12.95

Continues in the tradition of the *First Book of Commodore 64* in presenting some of the best programs and articles from COMPUTE! Publications, many revised or never before published. There's something for almost any Commodore 64 user in this 289-page book: arcade and text adventure games in BASIC and machine language, a commercial software-quality word processor, a program which adds 41 new commands to BASIC, an electronic spreadsheet, tutorials about programming sound and graphics, and utilities for saving, copying, and retrieving files. $12.95

A collection of outstanding games, applications, tutorials, and utilities from the most recent issues of *COMPUTE!* magazine and *COMPUTE!'s Gazette*, including several programs never before published. Commodore 64 users of all ages and experience will find this book informative, entertaining, and educational. Create an 80-column display, play educational and arcade-quality games, compose music, move sprites easily and quickly, and see how to program more efficiently and effectively. $12.95

Buy Now—This Offer Expires June 30, 1985.

Yes! I want to save money while I enjoy COMPUTE! Books.
_____ COMPUTE!'s First Book of Commodore 64, $12.95
_____ COMPUTE!'s Second Book of Commodore 64, $12.95
_____ COMPUTE!'s Third Book of Commodore 64, $12.95

All Orders Must Be Prepaid
☐ Payment Enclosed (check or money order)
☐ Charge ☐ MasterCard ☐ VISA ☐ American Express

Acct. No. _____ Exp. Date _____
Signature _____
Name _____
Address _____
City _____
State _____ Zip _____

To Order Call Toll Free **800-334-0868**
(in NC call **919-275-9809**)
or mail this coupon with your payment to:
COMPUTE! Books, P.O. Box 5406,
Greensboro, NC 27403

Please send me:
☐ 1 Book for $12.95
☐ 2 Books for $22.00
☐ 3 Books for $29.00

NC residents add 4.5% sales tax _____
Add $2.00 per book for shipping _____
Total Paid _____

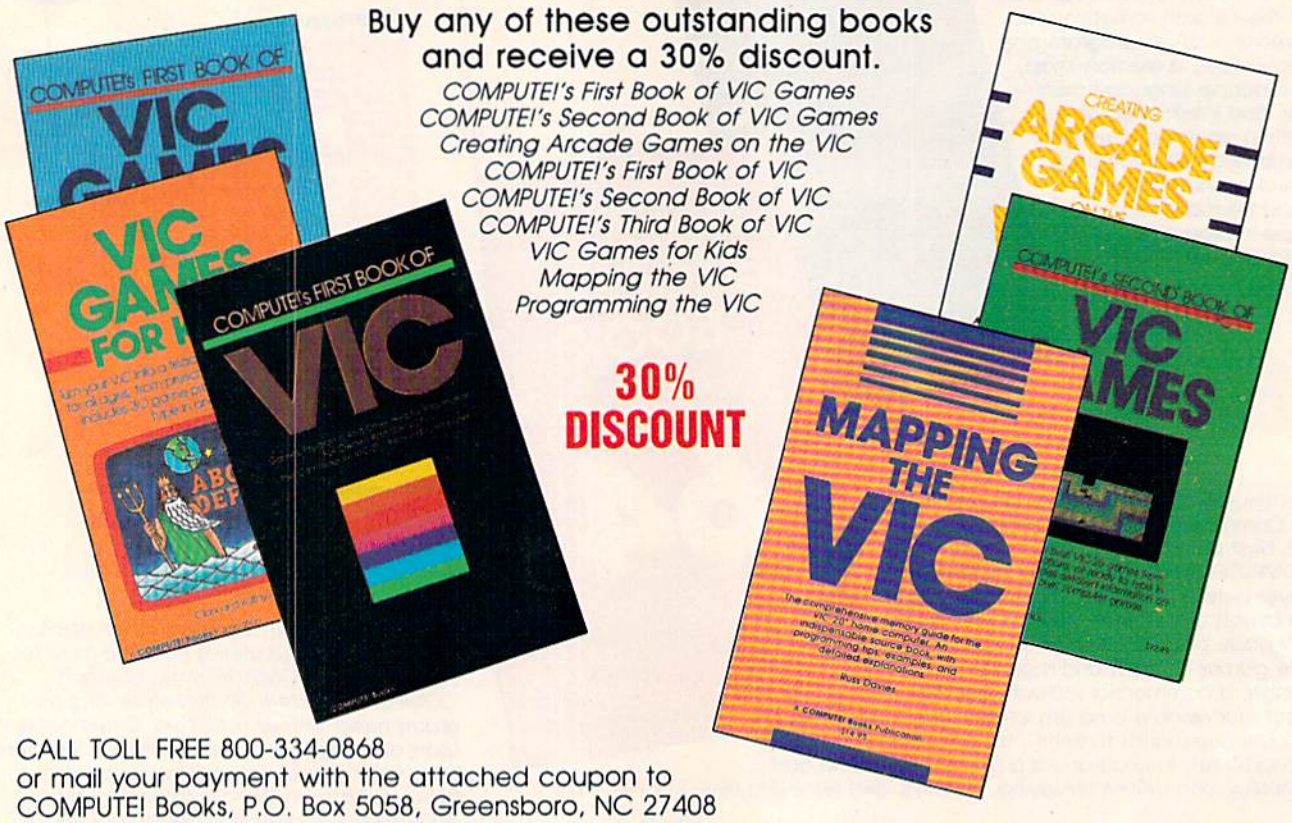
Please allow 4-6 weeks for delivery. 756112G

VIC-20 OWNERS
NOW'S YOUR CHANCE
TO COMPLETE YOUR VIC-20 COMPUTER BOOK LIBRARY

Buy any of these outstanding books and receive a 30% discount.

COMPUTE!'s First Book of VIC Games
COMPUTE!'s Second Book of VIC Games
Creating Arcade Games on the VIC
COMPUTE!'s First Book of VIC
COMPUTE!'s Second Book of VIC
COMPUTE!'s Third Book of VIC
VIC Games for Kids
Mapping the VIC
Programming the VIC

30% DISCOUNT



CALL TOLL FREE 800-334-0868
or mail your payment with the attached coupon to
COMPUTE! Books, P.O. Box 5058, Greensboro, NC 27408

Please send me the following VIC-20 computer books for my library:

___ *COMPUTE!'s First Book of VIC* $12.95 less 30%	**$9.07** each	___
___ *COMPUTE!'s Second Book of VIC* $12.95 less 30%	**$9.07** each	___
___ *COMPUTE!'s Third Book of VIC* $12.95 less 30%	**$9.07** each	___
___ *COMPUTE!'s First Book of VIC Games* $12.95 less 30%	**$9.07** each	___
___ *COMPUTE!'s Second Book of VIC Games* $12.95 less 30%	**$9.07** each	___
___ *Creating Arcade Games on the VIC* $12.95 less 30%	**$9.07** each	___
___ *VIC Games for Kids* $12.95 less 30%	**$9.07** each	___
___ *Mapping the VIC* $14.95 less 30%	**$10.46** each	___
___ *Programming the VIC* $24.95 less 30%	**$17.46** each	___

SUBTOTAL $ _____
NC RESIDENTS ADD 4.5% SALES TAX _____
SHIPPING AND HANDLING _____
($3.00 for *Programming the VIC*; $2.00 **per book** for all other books)
TOTAL PAID $ _____

☐ Payment Enclosed (check or money order)
☐ Charge ☐Visa ☐ MasterCard ☐ Am. Express

Acc't # _____ Exp. Date ___/___

Signature _____

Name _____
Address _____
City _____ State _____ Zip _____

Please allow 4–6 weeks for delivery

ALL ORDERS MUST BE PREPAID

756107G

get there, I had to use algebra..

Survival Math (Sunburst) is included because it consists of several real world simulations in which you apply math skills to everyday life.

The Money Management programs are in the same vein. *Tink's Subtraction Fair* (Mindscape) and *Donald Duck's Playground* (Sierra) teach younger children how to budget, count, and manage money.

Older children and adults can become chief executive officers of the *Whatsit Corp* (Sunburst) and manage its rising and falling fortunes. And *HomeWord Money Manager* (Sierra), *The Financial Cookbook* (Electronic Arts), *JK Lasser's Your Personal Money Manager* (Simon & Schuster), and *JK Lasser's Your Income Tax* (Simon & Schuster) act as "teaching tools" to help you structure, budget, and manage your finances.

The Professional Success programs include two excellent model railroad simulations—*Trains* (Spinnaker) and *Railroad Works* (CBS)—and *National Teacher Exam* (Krell), a preparation program, and *President's Choice* (Spinnaker), a challenging game in which you run the country as president.

Music

All the programs in this category attempt to teach music theory and encourage original composition. But, let the buyer beware: They are not the ultimate music teacher for adults or children. But they are a good start.

Song Maker (Fisher-Price) is notable because it's an introduction to music composition for very young children (ages four to eight). *The Music Shop* (Broderbund), *Music Construction Set* (Electronic Arts), *Bank Street MusicWriter* (Mindscape), and *Songwriter* (Scarborough) are all "teaching tools"—musical word processors with guidelines on how to compose your own music.

Rock 'N Rhythm (Spinnaker) lets you to create music in a studio environment. And *Notable Phantom* (DesignWare) places you in a musical adventure.

Three programs from Alfred Publishing (*Music Made Easy, Practical Music Theory,* and the *Music Achievement Series*) come the closest to being a real music teacher. They are the software versions of Alfred's popular theory and composition workbooks, and diagnostic evaluations.

Organization, Planning, Reference, And Scientific Method

The programs in these four categories are similar in that they all enhance the way you *think.* The database programs in the Organization category—*Friendly Filer* (Grolier), *Phi Beta Filer* (Scarborough), *Homeword Filer* (Sierra) and Scholastic's *Secret Filer* and *PFS:FILE*—are not just electronic card files. They are keys to new ways of thinking about information. With these programs you can use the computer to juggle facts the way you shuffle a deck of cards. They let you sort facts, cross reference them, "hide" them, prioritize them, list them, and compare them, all in a few seconds.

You can buy prerecorded databases for use with two of the programs—*Friendly Filer* and *PFS: File*—on important school subjects.

The Planning program, *Educalc* (Grolier), the Reference program, *Mastertype's Facts & Figures* (Scarborough), and the Scientific Method program, *Survey Taker* (Scholastic) let you play with numbers the way you play with facts using the database programs.

Outer Space, Weather, And People Skills

The programs in these three categories encourage learning valuable skills and knowledge and immediately applying them in the outside world. For example, *Halley Project* (Mindscape) puts kids at the control of a spaceship, teaches them how to navigate the solar system, and how to rendezvous with Halley's Comet (coming in early 1986).

Sky Travel (Commodore) is a miniature planetarium inside your computer and a "roadmap" to the heavens. My nine-year-old daughter, Catie, and I use it to find stars, planets, and constellations. I also recommend *Interplanetary Pilot* from CBS.

One of the weather programs, *Forecast!* (CBS), has taught Catie and me how to set up our own weather station and make forecasts. Another excellent choice is *Weather Tamers* from CBS.

Last, the People Skills program, *Many Ways to Say I Love You* (CBS), is the first program from Mr. Rogers' Neighborhood. It lets parents and children (ages 4 and up) construct and send text-and-animated-picture greeting cards with personalized messages.

Story Maker And Print Shop

The programs in these two categories are some of the most wonderful and rewarding I've found. They let you create your own newsletters, newspapers, stickers, buttons, books, greeting cards, cartoons, plays, and animated picture-and-text adventure stories. Many of the programs are accompanied by ideas-and-activities books and by extensive print materials. And the companies offer supplementary packages with extra materials for new projects.

These are true teaching tools. They guide you with suggestions, activities, adventures, and tutorials. Then, when you're ready, they turn you loose to create imaginative projects on your own.

The Story Maker category includes *Build-a-Book* and *Build-a-Book Refill Kit* from Scarborough; *Just Imagine* from Commodore; *Bank*

COMMODORE 64

* with $19.95 Software Purchase

$139.00*

- 170K Disk Drive $149.00 *
- Tractor Friction Printer $169.00
- 13" Hi-Res Color Monitor $189.00 *

* See Page 13

COMPUTER AND SOFTWARE SALE

CALL BEFORE YOU ORDER

PRICES MAY BE LOWER

SUPER AUTO DIAL MODEM COM 64

(Best communications package in USA)

$59.00

- Computer Learning Pad $37.95
- New Voice Synthesizer $49.00
- 12" Green or Amber Monitor $79.95
- 12" Daisy Wheel Printer $199.00

SPECIAL SOFTWARE COUPON

We pack a SPECIAL SOFTWARE DISCOUNT COUPON with every COMMODORE 64 COMPUTER, DISK DRIVE, PRINTER, or MONITOR we sell! This coupon allows you to SAVE OVER $500 OFF SALE PRICES!!

* COMMODORE 64 COMPUTER $139.00

You pay only $139.00 (with the $19.95 software purchase, see below) when you order the powerful 84K COMMODORE 64 COMPUTER! LESS the value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your computer that allows you to SAVE OVER $500 off software sale prices!! With only $100 of savings applied, your net computer cost is $39.00!!

* 170K DISK DRIVE $149.00

You pay only $149.00 (with the $19.95 software purchase, see below) when you order the 170K Disk Drive! LESS the value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your disk drive that allows you to SAVE OVER $500 off software sale prices!! With only $100 of savings applied, your net disk drive cost is $49.00.

* 13" HI-RES COLOR MONITOR $189.00

You pay only $189.00 (with the $19.95 software purchase, see below) when you order this 13" COLOR MONITOR with sharper and clearer resolution than any other color monitors we have tested! LESS value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your monitor that allows you to save over $500 off software sale prices!! With only $100 of savings applied, your net color monitor cost is only $89.00. (16 Colors).

80 COLUMN 80 CPS TRACTION/FRICTION PRINTER $169.00

You pay only $169.00 when you order the Comstar T/F deluxe line printer that prints 8½x11 full size, single sheet, roll or fan fold paper, labels, etc. Impact dot matrix, bidirectional. LESS the value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your printer that allows you to SAVE OVER $500 off software sale prices!! With only $100 of savings applied your net printer cost is only $69.00.

80 COLUMN BOARD $79.00

Now you program 80 COLUMNS on the screen at one time! Converts your Commodore 64 to 80 COLUMNS when you plug in the 80 COLUMN EXPANSION BOARD!! PLUS 4 slot expander! Can use with most software.

80 COLUMNS IN COLOR EXECUTIVE WORD PROCESSOR $39.00

This EXECUTIVE WORD PROCESSOR is the finest available for the COMMODORE 64 computer! The ULTIMATE FOR PROFESSIONAL Word Processing, DISPLAYS 40 or 80 COLUMNS IN COLOR or black and white! Simple to operate, powerful text editing with 250 WORD DICTIONARY, complete cursor and insert/delete key controls line and paragraph insertion, automatic deletion, centering, margin settings and output to all printers! Includes a powerful mail merge.
List $99.00 **SALE $39.00** Coupon $29.95

(Examples)
PROFESSIONAL SOFTWARE COMMODORE 64

Name	List	Sale	Coupon
Executive Word Processor	$99.00	$39.00	$29.95
Executive Data Base	$69.00	$29.00	$19.95
20,000 Word Dictionary	$24.95	$14.95	$10.00
Practicalc II	$69.95	$49.95	$44.95
Print Shop (Disk)	$44.95	$32.95	$26.95
Practicalc	$59.95	$24.95	$19.95
Programmers Reference Guide	$20.95	$16.95	$12.50
Programmers Helper (Disk)	$59.95	$29.95	$19.95
80 Column Screen (Disk)	$59.95	$29.95	$19.95
Disk Filer (by Flip-N-File)	$39.95	$14.95	$12.95
Deluxe Tape Cassette	$89.00	$44.95	$34.95
Pro Joy Stick	$19.95	$12.95	$10.00
Light Pen	$39.95	$14.95	$ 9.95
Dust Cover	$ 8.95	$ 6.95	$ 4.60
Simon's Basic	$29.95	$22.95	$19.95
Pitstop II Epyx	$39.95	$24.95	$19.95
Super Graphics Expander	$29.95	$22.95	$19.95
Music Calc 1	$59.95	$29.95	$24.95
Filewriter	$59.95	$29.95	$24.95

(See over 100 coupon items in our catalog)

Write or call for Sample SPECIAL SOFTWARE COUPON!

EXECUTIVE QUALITY PROFESSIONAL BUSINESS SOFTWARE

The Cadillac of Business Programs for Commodore 64 Computers

Item	List	Sale	Coupon
Inventory Management	$79.95	$29.95	$24.95
Accounts Receivable	$79.95	$29.95	$24.95
Accounts Payable	$79.95	$29.95	$24.95
Payroll	$79.95	$29.95	$24.95
General Ledger	$79.95	$29.95	$24.95

The $19.95 Software Purchase Options

	LIST	SALE
1. 24 Program Bonus Pack (tape or disk)	$29.95	$19.95
2. Oil Barrons-Strategy Board Game	$49.95	$19.95
3. Disk Drive Cleaner	$29.95	$19.95
4. HES Games (disk)	$29.95	$19.95
5. Pogo Joe (tape or disk)	$29.95	$19.95

SUPER AUTO DIAL MODEM $59.00

Easy to use. Just plug into your Commodore 64 computer and you're ready to transmit and receive messages. Easier to use than dialing your telephone, just push one key on your computer! Includes exclusive easy to use program for up and down loading to printer and disk drives.
List $129.00 **SALE $59.00**.

NEW COMPUTER LEARNING PAD $37.95

Makes other graphics tablets obsolete. This new TECH SKETCH LEARNING PAD allows you to draw on your T.V. or Monitor and then you can print whatever you draw on the screen on your printers. FANTASTIC!!!
List $79.95 **SALE $37.95**.

NEW VOICE SYNTHESIZER $49.00

For Com-64 or VIC-20 computers. Just plug it in and you can program words and sentences, adjust volume and pitch, make talking adventure games, sound action games and customized talkies!! FOR ONLY $19.95 you can add TEXT TO SPEECH, just type a word and hear your computer talk — ADD SOUND TO "Zork", SCOTT ADAMS AND AARDVARK ADVENTURE GAMES!! (Disk or tape.)

12" GREEN OR AMBER MONITOR $79.95

Your choice of green or amber screen monitor, top quality, 80 columns x 24 lines, easy to read, anti-glare! PLUS $9.95 for connecting cable. Com-64 or VIC-20.

12" DAISY WHEEL PRINTER $199.00

"JUKI" Superb letter quality daisy wheel printer, 12" extra large carriage, up to 12 CPS bi-directional printing, drop in cassette ribbon, centronics parallel or RS232 serial port built in! (Specify)
List $299.00 **SALE $199.00**

CARDCO G+ INTERFACE $59.00

For Commodore 64 and Vic 20 computers. Lets you use other printers with Centronics interfaces. This interface lets the printer act like a Commodore printer including printing the Commodore graphics (Dot matrix with graphic capability printers).
List $109.00 **SALE $59.00**.

PROTECTO WARRANTY

All Protecto's products carry a minimum 90 day warranty. Therefore, if anything fails within 90 days from the date of purchase, you simply send your product to us via United Parcel Service prepaid. We will IMMEDIATELY send you a replacement at no charge via United Parcel Service prepaid. This warranty proves once again that ***We Love Our Customers***.

- LOWEST PRICES • 15 DAY FREE TRIAL
- BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL

PHONE ORDERS
8 a.m. - 8 p.m. Weekdays
9 a.m. - 12 noon Saturdays

- 90 DAY FREE REPLACEMENT WARRANTY
- OVER 500 PROGRAMS • FREE CATALOGS

Add $10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $20.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES EXCEPT CANADA.
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!
VISA — MASTER CARD — C.O.D. No C.O.D. to Canada, APO-FPO

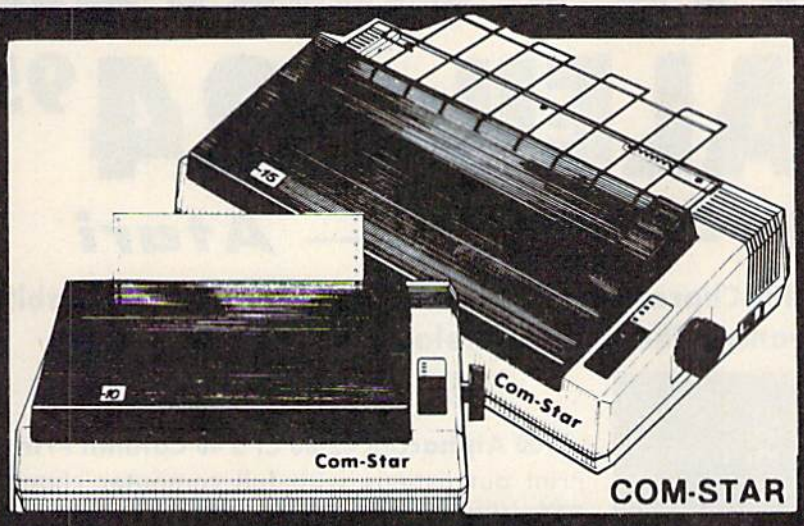
PROTECTO

We Love Our Customers

Box 550, Barrington, Illinois 60010

312/382-5244 to order

FANTASTIC COMPUTER PRINTER SALE!!!



10X COM-STAR*

Tractor Friction Printer

130-150 CPS

Only **$199**

List $499

- *Lowest Sale Price, Premium Quality, Tractor/Friction Printer in the U.S.A. (Best Value)*
- *High Speed 130-150 Characters Per Second • 40, 46, 66, 80, 96, 132 line spacing*
- *Word Processing, Letters • Business Forms • Labels, Graphics, Tables • List Programs*
- *Fantastic Graphics • Print Modem Data • The Most Important Accessory For Your Computer*

Premium Quality 130-150 CPS 10X COM-STAR Printer $199

10" carriage, prints 8½"x11" standard single sheet or continuous feed paper, Bi-directional, impact, dot matrix, 130-150 CPS, 9 x 9 dot matrix with double strike capability for 18 x 18 dot matrix (near letter quality), high resolution big image, underlining, back spacing, true lower descenders with super and subscripts, prints standard, italic, block graphics, and special characters. It gives you print quality and features found on printers costing twice as much!! (Centronics Parallel Interface) (Better than Epson FX80). List $499.00. **Sale $199.00.**

Premium Quality 150-170 CPS 15½X COM-STAR Business Printer $319.00

Has all the features of the 10X COM-STAR PRINTER plus 15½" carriage and more powerful electronics components to handle large ledger business forms! (Better than Epson FX 100). List $599. **Sale $319.00.**

JUKI®

12" DAISY WHEEL PRINTER $199.00

"JUKI" Superb letter quality daisy wheel printer, 12" extra large carriage, up to 12CPS bi-directional printing, drop-in cassette ribbon, (90 day warranty) centronics parallel or RS232 serial port built in! (Specify). List $299.00. **Sale $199.00.**

JUKI®

Printer/Typewriter Combination $279.00

"JUKI" Superb letter quality, daisy wheel printer/typewriter combination. Two machines in one — just a flick of the switch. 12" extra large carriage, typewriter keyboard, automatic margin control and relocate key drop in cassette ribbon! (90 day warranty) centronics parallel or RS232 serial port built in (Specify). List $399.00. **Sale $279.00.**

Olympia

Executive Letter Quality $339.00 15" Daisy Wheel Printer

This is the world's finest daisy wheel printer. Fantastic letter quality, up to 20 CPS bi-directional, will handle 14.4" forms width! Has a 256 character print buffer, special print enhancements, built in tractor-feed (Centronics Parallel and RS232C Interface) (90 day warranty). List $649.00. **Sale $339.00**

Olympia

Printer/Typewriter Combination $439.00

Better than IBM Selectric. Superb computer printer combined with the world's finest electronic typewriter. Two machines in one, just flick the switch for up to 20 CPS printing (**300 Words per minute**) on a 15" carriage that handles up to 14 1/8" in. paper. Drop in cassette ribbon — express lift off correction, Centronics parallel interface (90 day warranty). List $749.00. **Sale $439.00.**

- ***15 Day Free Trial — 1 Year Immediate Replacement Warranty***

PARALLEL INTERFACES

Atari — $59.00. For VIC-20 and COM-64 — $59.00. Apple — $79.00.

Add $14.50 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $29.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars.

WE DO NOT EXPORT TO OTHER COUNTRIES, EXCEPT CANADA.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days delivery. 2 to 7 days for phone orders. 1 day express mail!

VISA — MASTERCARD — C.O.D. No C.O.D. to Canada or APO-FPO

PROTECTO

We Love Our Customers

Box 550, Barrington, Illinois 60010

312/382-5244 to order

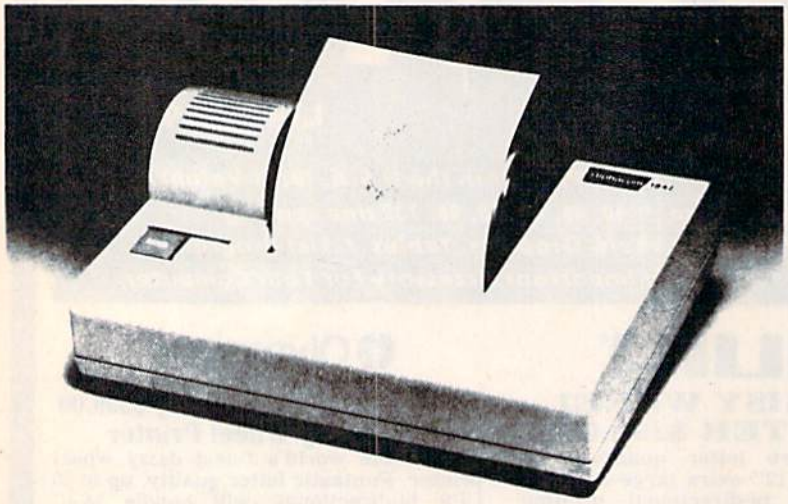
COM-STAR PLUS+ Print Example: ABCDEFGHIJKLMNOPQRSTUVWXYZ ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

FANTASTIC PRINTER

$24.95 SALE!! $24.95

Commodore 64 — VIC 20 — Atari

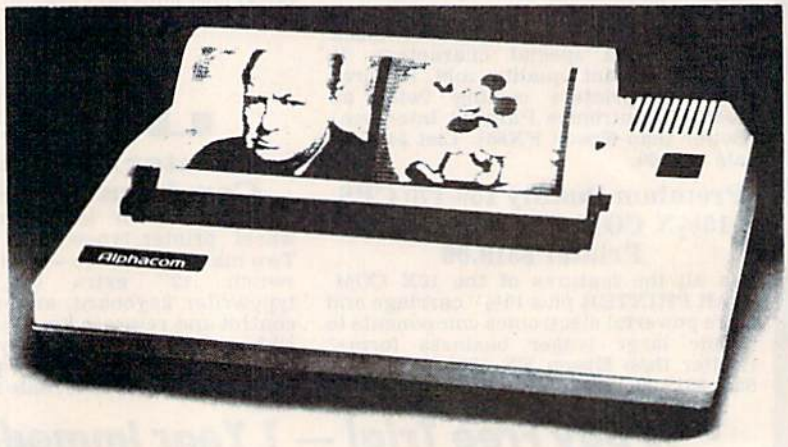
☆ **40 And 80 Column Printers** ☆ **Up To 100 Characters Per Second** ☆ **Full Graphics Capability**
☆ **Upper And Lower Case** ☆ **Advanced Thermal Technology For Quiet Operation**



3100 Alphacom 42-80 CPS 40 Column Printer
Print out listings with full computer character sets (interface required, see below). Print in upper and lower case. Comes with a roll of paper and all power adapters needed. Perfect for a spare printer or program lister. List $99.00. **Sale $24.95.**

40 Column Extra Paper	LIST	**SALE**
3103 25 Meter Rolls Blue	$9.95	**$3.00**
3104 40 Meter Rolls Blue	$16.95	**$3.95**
3105 25 Meter Rolls Black (1 per pkg.)	$12.95	**$3.95**
3106 25 Meter Rolls Blue (2 per pkg.)	$19.95	**$5.95**
3107 25 Meter Rolls Black (2 per pkg.)	$19.95	**$5.95**

3150 Alphacom 81-100 CPS 80 Column Printer
Now you can have a printer for the cost of a large box of paper. This printer prints in upper and lower case with true lower descenders. Comes with 1 roll of paper and power adapter. With the intelligent interfaces (sold below) you can do Ascii graphics as well as Atari or Commodore graphics. Plus you can do underlining and expanded modes. Print out pictures, program listings, word processing pages, etc. Perfect for the student or homeowner. List $199.00. **Sale $39.95.**



80 Column Extra Paper	LIST	**SALE**
3153 40 Meter Rolls Blue	$14.95	**$3.95**
3154 40 Meter Rolls Black	$19.95	**$4.95**
3155 25 Meter Rolls Blue (2 per pkg.)	$19.95	**$7.95**
3156 25 Meter Rolls Black (2 per pkg.)	$19.95	**$8.95**

3101 Intelligent Commodore Interface — Allows you to hook the 40 or 80 column printer to the Commodore 64, do program listings, allows software screen dumps, etc. Includes Commodore graphics and reverse characters. (Specify 40 or 80 Column) List $59.95.
40 Column Sale $9.95. 80 Column Sale $14.95.

3102 Intelligent Atari Interface — Allows you to hook the 40 or 80 column printer to the Atari computer, do program listings, allows software screen dumps, etc. Includes Atari graphics and reverse characters. (Specify 40 or 80 Column) List $59.95.
40 Column Sale $9.95. 80 Column Sale $14.95.

Add $10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $20.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES EXCEPT CANADA.
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders. 1 day express mail!
VISA — MASTER CARD — C.O.D. No C.O.D. to Canada, APO-FPO

PROTECTO

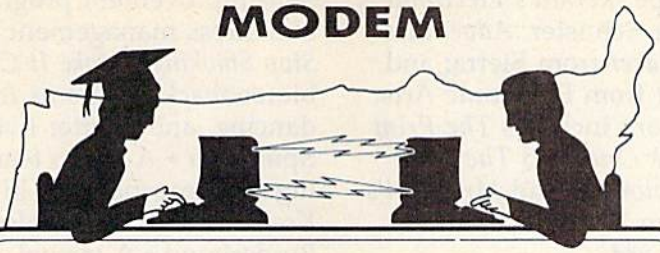
We Love Our Customers

Box 550, Barrington, Illinois 60010

312/382-5244 to order

Commodore 64 MODEM

Sale



Sale

$59 List $129.95

Telecommunications

$59 List $129.95

Lowest Price In the U.S.A.

FOR CHILDREN·ADULTS·BUSINESS

Complete Auto Dial Telecommunications Package

"The only telecommunications package you will ever need."

(Exclusive Easy To Use Features)

NEW

Total Telecommunications

NEW

• 300 Baud Modem • Auto Dial • Auto Answer • Upload & Download

• Membership in 52 Database Services (UPI News, etc.)

Reach Out and Access Someone

- Educational courses
- Financial Information
- Banking at Home
- Popular Games
- News Updates and Information
- Electronic Shopping
- Research and Reference Materials

The Total Telecommonications Package offers you all this plus ...

- Auto Log-on
- Dialing from Keyboard
- On-line Clock
- Capture and Display High Resolution Characters
- Download Text, Program or Data Files
- Stores on Disk Downloaded Files
- Reads Files from Disk and Uploads Text or Program Files
- Select Any Protocol (access almost any computer or modem)
- Plus Much, Much More

List $129.95 **Special Low-Low Price $59.00**

We are so sure this is the only telecommunications package you will need we will give you 15 days Free Trial.

Add $3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES, EXCEPT CANADA.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!

VISA — MASTER CARD — C.O.D.

No C.O.D. to Canada, APO-FPO.

PROTECTO

We Love Our Customers

Box 550, Barrington, Illinois 60010

312/382-5244 to order

Street Storybook, *Show Director*, and *Mr. Pixel's Cartoon Kit* from Mindscape; *Kermit's Electronic Story Maker* from Simon & Schuster; *Adventure Master* from CBS; *Story Maker* from Sierra; and *Adventure Construction Set* from Electronic Arts.

The Print Shop category includes *The Print Shop Graphics Library (Disk One)* and *The Print Shop* from Brøderbund; *Color Me* and *Mr. Pixel's Programming Paint Set* from Mindscape; and *News Room* from Springboard.

Fred's Wish List

These 106 programs are just the tip of the iceberg of a new genre of real world software. Here are some programs now available on other computers that I'd like to see really soon on the Commodore 64:

• A paper airplane construction kit (Simon & Schuster) • *Make Millions* (Scarborough), a factual simulation that challenges you to go from rags to riches while managing everything in real time • Self-improvement programs like diet, nutrition, and stress management programs from Bantam; *Stop Smoking!*; *Make It Click* (using seatbelts); and biofeedback programs from Sunburst • Nutrition, dancing, and "better living" programs from Spinnaker • A piano teacher from Alfred Publishing • Diagnostic tools in math and reading from Krell • A hardware/software science tool kit from Brøderbund • A factual, around-the-world mystery game from Brøderbund that comes with a copy of *The World Almanac* • *Keys to Responsible Driving* from CBS • *Robot Odyssey I* (a robot and microchip construction set) from The Learning Company • *Remember!*, an amazing study aid and homework planner for high school students from DesignWare • *Get Organized!* (Electronic Arts) and *SkiWriter II* with *Mail/Merge* (Prentice-Hall), two easy-to-use, low-cost organizing and communications tools.

Character Assassination

Kent Brewster

This short, easy-to-type-in program can help children and computer newcomers learn their way around the keyboard. Both letter and number recognition are taught. For the VIC and 64.

Quick, where's the Z? Letters and numbers are dropping from the sky, and only by pressing the correct key can you save the city below.

"Character Assassination" is a typing tutorial suitable for almost any age and skill level. It's especially helpful to those learning the keyboard, but can be good practice even for those with some experience.

Preventing Disaster

After typing in the program, type RUN. You are then asked to select a speed. There are ten choices (0–9), with 0 as the slowest and 9 the fastest. After making a choice, be prepared to begin immediately. A multicolored city appears at the bottom of the screen, and your job is to prevent its being destroyed. A random number or letter falls whining from the top left of the screen toward the city. If you press the correct key, it explodes and disintegrates. The next character begins falling one position from the right of the previous one, and so on, until 40 characters (22 for the VIC) have fallen. After the character in the rightmost column has fallen, the action continues back at the left side of the screen. Your score, at the top of the screen, increases according to the speed and accuracy of your response.

If a character reaches the city, it destroys a building with an ominous explosion. The game ends when the city has been destroyed.

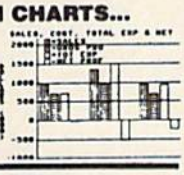
After you begin playing, if you find that the level you've chosen is too easy or difficult, press RUN/STOP–RESTORE, then type RUN and select a new level. Student progress can be monitored by jotting down the level and previous high score.

Each version of Character Assassination is only 25 lines, so it can be typed in quickly. Those interested in the programming techniques will find the short listing helpful to study.

See program listings on page 132.

Hardworking
Software from Abacus

MAKE YOUR OWN CHARTS...
CHARTPAK-64

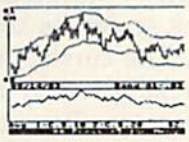


Produce pro-quality charts and graphs instantly in 8 chart formats. Hardcopy in two sizes to popular dot matrix printers. **$39.95**

ORGANIZE YOUR DATA...
DATAMAT-64 Powerful, data managment package. Free form screen design. Complete flexible reporting, sorting, selection. More. **$39.95**

DETAIL YOUR DESIGNS...
CADPAK-64 Superb lightpen design tool. Draw LINEs, BOXes, CIRCLEs, ELLIPSEs; pattern FILLing; freehand DRAW; COPY sections of screen; ZOOM; more. Hardcopy. **$49.95**

CHART YOUR OWN STOCKS...
TAS-64 Sophisticated technical analysis charting package. 7 moving averages. 3 oscillators, trading bands, more. **$84.95**



CREATE SPREADSHEETS & GRAPHS
POWER PLAN-64

Powerful spreadsheet with builtin graphics. Comprehensive handbook, tutorial, help, format, cell protect, much more. **$49.95**

Other titles available. FREE CATALOG and name of nearest dealer, write or call (616) 241-5510.

For postage and handling, include $4.00 per order ($8.00 per item foreign). Money Order and checks in U.S. dollars only. Mastercard, VISA and American Express accepted. Michigan residents include 4% sales tax.

You Can Count On **Abacus Software**

P.O. Box 7211 Grand Rapids, MI 49510 - Telex 709-101 - Phone 616/241-5510

PROFESSIONAL ELECTRONIC ENGINEERING SOFTWARE

FOR COMMODORE C-64™
Practical, Powerful and Friendly

- AC/DC Circuit Node/ Transfer Function Analysis
- Negative Active Filters (BP, HP, LP) Design & Analysis
- Positive Active Filters (BP, HP, LP) Design & Analysis
- Magnitude and Phase Bode Plots for Transfer Functions
- Polynomial Roots Extractor

All 5 programs on one disk. Supergraphics with fast hard copy printouts on most printers.

$39.95
ADD $1.95 SHIPPING
CA RESIDENTS ADD 6% TAX

TO ORDER, send check or money order to:

BAMTEK
1541 N. China Lake Blvd.
Suite #584
Ridgecrest, CA 93555
(619) 446-5311 ext. 584
For Additional Information Call or Write to Above

PROGRAM PROTECTION MANUAL FOR THE C-64 VOLUME II

Not just a third edition — a new and up-to-date manual covering the latest advances in program protection. Over 275 pages of valuable information. Topics include:

ENCRYPTION AND DECRYPTION
UNDOCUMENTED OPCODES
GCR RECORDING
CUSTOM DOS ROUTINES INCLUDING:
Halftracks
Extra Tracks and Sectors
Non-Standard Sectors
Nybble Counting
Track Arcing
Density Changes
Synchronized Tracks
CARTRIDGES AND EPROMS
Using an Eprom Programmer
Cartridge Protection Schemes
Eprom Design and Manufacture
PROTECTING YOUR OWN SOFTWARE
TIPS FROM EXPERTS ON PROTECTION AND BACKUP
AND MUCH, MUCH MORE . . .

A disk is included to help explain the concepts.

$34.95 + Shipping

1541 DISK DRIVE ALIGNMENT PROGRAM - VERSION 2

No special tools or knowledge are required to properly align the 1541 disk drive with this program (although average mechanical ability is required).

A WELL TESTED, PROVEN PRODUCT, NOW EVEN MORE ACCURATE!! VERSION 2 FEATURES A NEW CALIBRATION DISK, SPECIALLY PREPARED ON SOPHISTICATED EQUIPMENT FOR EXTRA PRECISION.

NO FANCY SCREEN DISPLAYS OR HI-RES GRAPHICS. JUST A GOOD, SOLID DISK DRIVE ALIGNMENT PROGRAM — THOUSANDS ALREADY IN USE!! SEE THE REVIEW IN THE OCTOBER 1984 ISSUE OF *COMPUTE!'s GAZETTE*.

$44.95 + Shipping

updates available to prior purchasers for **$20.00 + Shipping**

PROGRAM PROTECTION MANUAL FOR THE C-64 VOLUME I

This is the original protection manual. Covers bad blocks, BASIC and ML protection schemes, reset and cartridge switches and much more. Program disk is included, with many helpful programs. If you are just getting into program protection, this volume is required reading!!

$29.95 + Shipping

CARTRIDGE BACKER

THE ORIGINAL CARTRIDGE BACKUP SYSTEM, NOW EVEN BETTER.

PACKAGE INCLUDES:

1. **EXPANSION BOARD, PROGRAM DISK AND USER'S MANUAL**
2. CARTRIDGE BACKER software to backup 99% of the most popular cartridges to disk.
3. ART'S, ACTIVE AND PARKER BACKER software to backup many disk programs.
4. **SUPERBOOTER** — to create your own autoboots.
5. **SUPERSAVER** — copies files to or from disk or tape.
6. **SOLD FOR ARCHIVAL USE ONLY!!**

Cartridges are saved to disk with an autoboot and will run as-is. Unlike all other cartridge backup systems, *NO EXTERNAL RAM BOARDS, ROMS OR CARTRIDGES ARE REQUIRED.*

FOR THE C-64

$54.95 + Shipping

SINGLE SLOT EXPANSION BOARD

- **FULLY SWITCHED, including GAME, EXROM, ENABLE AND POWER SWITCHES.**
- LED indicators for type of cartridge
- **RESET BUTTON**
- COMPACT - approximately same size as cartridge

Designed especially for those who don't need a $65.00+ expansion board.

$24.95 + Shipping

C S M
SOFTWARE, INC.

P.O. Box 563, Crown Point, IN 46307
(219) 663-4335

VISA AND MASTERCARD ACCEPTED
DEALER INQUIRIES INVITED

Shipping $3.50 per item in U.S.; foreign orders extra

NUMERIC KEYPAD

FOR VIC and C-64

NO SOFTWARE REQUIRED

100% COMPATIBLE WITH ALL SOFTWARE

MORE FUNCTIONS THAN KEYPADS COSTING $79.95

7	8	9	★	
4	5	6	/	←
1	2	3	+	↑
0	'	•	—	DEL
ENTER		SH	↓	

$64.95 + Shipping

REVIEWS

Bank Street Music Writer

This screen-oriented music editor is designed for that large circle of computer owners who want to make music without getting bogged down in programming details. Many music editing programs are slow and tedious to use, requiring that you type in something like *V1* to choose a voice, *O4* for the octave, *F#* for the pitch, and so on. By letting you compose directly on the screen, *Bank Street Music Writer* makes computer music far more interactive, and less tedious.

The program's editing screen provides a crisp graphics display of the familiar musical staffs, with bass and treble clefs. To enter a note, you move a cursor to the correct spot on the staff, and press 4 for a quarter note, 2 for a half note, and so on. The effect is much like having a "musical typewriter." Each note is played and printed on the screen as soon as you enter it. The cursor then moves right, making it easy to enter a series of notes. Since the Commodore 64 has three voices, you're limited to three part compositions.

All music is displayed in conventional notation; each note, accidental, rest, etc., appears as it would in a piece of sheet music. Most features, such as triplets and dotted notes, are available; and in many ways, this program does with music what a word processor does with text. It's easy to replace or delete notes, copy or repeat whole passages, change waveforms, and review all or part of your work at any time. Finished compositions can be saved to disk for future editing or replay, or output to a printer (on properly configured systems). Since what you see is what you get, it's a snap to transcribe songs from sheet music, or print your own songs in standard form.

Serious musicians, however, may find this package somewhat limited. You can separately control the ADSR (attack, decay, sustain, release) parameters of each voice, but the 64's noise waveform can't be used at all, so true percussion effects are impossible. Nor do you have any way to use the 64's most advanced sound features (filtering, ring modulation, envelope following, etc.). Without filtering, you can use only the 64's standard, unmodulated waveforms; this sharply limits the number of available sounds. After using the program for a while, you may wish it were possible to create a convincing banjo twang, wah-wah effect, or whatever.

To be fair, many users won't miss the advanced features, and the program isn't intended for arcane sound effects, anyway. Termed a *notation*

VIDEO BASIC-64 — add 50+ graphic and sound commands to your programs with this super development package. You can distribute free RUNTIME version without paying royalties! **$59.95**

BASIC COMPILER-64 — compiles the complete BASIC language into either fast 6510 machine language and/or compact speedcode. Get your programs into high gear and protect them by compiling. **$39.95**

MASTER-64 — professional development package for serious applicants. Indexed file system, full screen management, programmer's aid, BASIC extensions, 100 commands. **$39.95**

PASCAL-64 — full Pascal with extensions for graphics, sprites, file management, more. Compiles to 6510 machine code and can link to Assembler/Monitor routines. **$39.95**

FORTRAN-64 — based on Fortran 77. Common, Data, Dimension, Equivalence, External, Implicit, Goto, Else If, Do, Continue, Stop, Subroutine, Call, Write, Read, Format, more. April 1985 **$39.95**

ADA TRAINING COURSE — teaches you the language of the future. Comprehensive subset of the language, editor, syntax checker/compiler, assembler, disassembler, 120+ page guide. **$59.95**

C-LANGUAGE COMPILER — a full C language compiler. Conforms to the Kernighan & Ritchie standard, but without bit fields. Package includes editor, compiler and linker. April 1985 **$79.95**

Other titles available: Write or call:

PHONE: (616) 241-5510

For postage and handling include $4.00 ($8.00 foreign) per order. Money order and checks in U.S. dollars only. mastercard, VISA and American Express accepted. Michigan residents incl 4% sales tax.

Abacus Software
P.O. Box 7211 Grand Rapids, MI 49510

editor by the publisher, *Bank Street Music Writer* is simply a convenient, well-crafted tool for composing what most people consider "real" music. Within the limits of that design, it performs very well indeed. Given its clear, well-organized instruction manual, practically anyone will be able to produce respectable music at the first sitting.

—Philip I. Nelson

Mindscape, Inc.
3444 Dundee Road
Northbrook, IL 60062
$49.95 (disk)

Allegro

This is a comprehensive music and sound effects package that attempts to harness virtually every feature of the 64's SID chip. The result is a program that's powerful, but rather forbidding in complexity. Its instruction manual contains 75 pages of detailed explanation, and the author warns that no one, not even experienced musicians or 64 programmers, should expect to master the system overnight.

To compose music with *Allegro*, you type statements in a language the author calls "Forte." Here's a short sample of Forte syntax from the instruction manual:

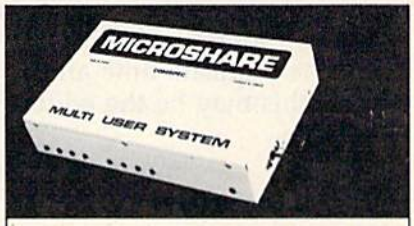
```
&1+ V1 O4 G D F F= D F
```

Once a composition has been entered, it must be compiled (condensed into more compact form), a process that takes only a few seconds for short songs. Then (and only then), the composition can be played. To make changes, you must recall the Forte file, type the corrections, recompile it, list it again, and so on.

In practice, this process is less difficult than it sounds, but the average user may find it tedious to compose music by such abstract methods. Unless you have perfect pitch (or a piano next to your computer), it's hard to know what note to enter next; and translating music from conventional notation into Forte syntax is laborious. Learning to write music with *Allegro* is much like learning to program in BASIC; beginners should

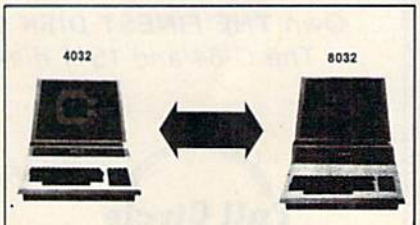
MICROSHARE

PET/CBM MULTI USER DISK SYSTEM
- ALLOWS UP TO SIXTEEN USERS TO SHARE DISK DRIVES AND/OR PRINTERS
- WORKS WITH ALL PET/CBM EQUIPMENT
- 100% HARDWARE INTERFACED
- NO ALTERATIONS TO SOFTWARE OR SPECIAL SOFTWARE REQUIRED
- SOFTWARE TRANSPARENT — WORKS WITH ALL PET/CBM SOFTWARE
- LANGUAGE TRANSPARENT — WORKS IN ANY LANGUAGE
- NO SPECIAL COMMANDS USED
- PROTECTS AGAINST SYSTEM LOCKUP



COMMODORE 64 MULTI USER DISK SYSTEM
- ALLOWS UP TO EIGHT USERS TO SHARE DISK DRIVES AND/OR PRINTERS
- WORKS WITH ALL 64/VIC EQUIPMENT
- **BUILT IN IEEE AND 64/VIC SERIAL PORTS** (WORKS WITH ALL IEEE DEVICES)
- 100% HARDWARE INTERFACED
- NO ALTERATIONS TO SOFTWARE OR SPECIAL SOFTWARE REQUIRED — SOFTWARE TRANSPARENT
- NO SPECIAL COMMANDS USED
- **BUILT IN 16K PRINT BUFFER**
- DISK DRIVE PRIORITY

GREATER PRODUCTIVITY & LOWER COST
FOR BUSINESS AND EDUCATIONAL USE



40 TO 80 COLUMN CONVERSION
- EXTERNALLY SWITCHABLE FROM 40 TO 80 COLUMNS
- EXTERNALLY SWITCHABLE FROM 80 TO 40 COLUMNS
- CONVERSIONS FOR BOTH 4032's AND 8032's
- 100% SOFTWARE COMPATIBILITY IN EITHER MODE
- HARDWARE (NOT SOFTWARE) MODIFICATION
- ALL KEYS FROM 8032 EMULATED ON 4032
- SPECIAL FUNCTION KEYS

MICROSHARE 64K PRINT BUFFER
- LOW COST
- REDUCES LONG WAITS — SAVES TIME
- ALLOWS YOU TO PRINT AND PROCESS SIMULTANEOUSLY
- IEEE INPUT — IEEE OR CENTRONICS PARALLEL OUTPUT
- WORKS WITH ALL PET/CBM SOFTWARE
- NO INSTALLATION REQUIRED
- ELIMINATES THE FRUSTRATION OF WATING FOR YOUR PRINTER

COMMODORE 64, PET, AND CBM ARE ALL TRADEMARKS OF COMMODORE BUSINESS MACHINES, INC.

DEALER INQUIRIES INVITED.

MANUFACTURED BY:
COMSPEC COMMUNICATIONS INC.
153 BRIDGELAND AVE., UNIT 5,
TORONTO, ONTARIO M6A 2Y6
(416) 787-0617

plan to spend a lot of time flipping back and forth in the instruction manual, and correcting the inevitable typing errors.

Needless to say, this type of program is not well suited to the casual or impatient user. Given the complexity of the 64's SID chip, any program that truly implements all its features is bound to be involved. Once you're familiar with the system, however, you can generate anything from a Mozart sonata, to "electronic" music or wholly nonmusical sound effects. Even better, your creations are portable: *Allegro* music or sound effects can be added to your own BASIC programs without significantly affecting BASIC. If you want to squeeze the most out of your 64's sound system, and have the requisite time and patience, this may be the editor for you.

—Philip I. Nelson

Artworx Software, Inc.
150 N. Main Street
Fairport, NY 14450
$39.95 (disk)

Sky Travel

Even though I've always had a special fascination with the night sky, my early ambition to become an astronomer took a back seat when I detoured into chemistry and, later, computers. I never developed more than a rudimentary knowledge of astronomy. But *Sky Travel* promised to change all this. It is billed as, "A Window to Our Galaxy. Learn About the Stars. Ages 12 & Up." But two questions come to mind. Would the program work and would it be the painless way for me to become an expert in astronomy?

Sky Travel comes as a package—a protected disk and entertaining manual (138 pages). The lengthy program does take a long time to load on a 1541 drive. Even though protected, it will load using an MSD drive or an IEEE drive and BusCard II.

The program opens with a view of the night sky as seen in Washington, D.C., at 4:15 a.m. on January 1, 1985. Looking south at an elevated angle of 60 degrees, you observe the outline of the constellation Leo. Your field of view is 72 degrees,

Nobody copies better !!

Since November 1984, Mr. Nibble has successfully copied heavily protected diskettes for grateful C-64 owners!

While others promise,

MR. NIBBLE™

delivers!

The next generation in archival methods is here today!

- *No better disk copier at any price*
- *Easy-to-use — no complicated instructions*
- *Totally automatic — no knowledge of DOS required*
- *You'll LOVE MR. NIBBLE™ — if not, return within 10 days for full refund*

Own ***THE FINEST DISK COPIER SYSTEM*** *for The C-64 and 1541 disk drive -* *Order today!*

Full Circle Software

FULL CIRCLE SOFTWARE, INC.
P.O. Box 1373
Dayton, Ohio 45401
Phone (513) 223-2102

$49.95 includes shipping & handling (Ohio residents add 6% sales tax)

10 day return privilege

Special MSD Version now available!

1541 FLASH!
It's No Flash in the Pan
The new Skyles Electric Works 1541 Flash! loads programs and files to your Commodore 64 three times faster than an unenhanced Commodore disk drive can. Faster than any other Commodore single disk drive with an IEEE interface.
It gives your 1541 disk drive the speed of much more expensive drives—at three times its normal speed! The 1541 Flash! is faster than the MDS disk drives and any parallel interface; faster than the Commodore 2031. The Skyles Electric Works 1541 Flash! is one of the most exciting time-saving devices we've ever seen.
■ It's Permanent
The Flash! is a permanent firmware installation in your Commodore 64 and 1541 disk drive. It has both a software (ROM) and a hardware component.
■ It's Transparent
Best of all, the 1541 Flash! is transparent. Computer operations all remain unaffected as it speeds up every disk-related function. And there is nothing new to learn for the Flash! No special tricks or techniques. Once it's in, just watch it go. We have tested it on well over one hundred programs and it loads spectacularly fast.
■ It's Flexible
And it's flexible. The 1541 Flash! adds 21 extra commands for the Commodore 64 user. These include a built in "DOS WEDGE", eight editing commands, a couple of easy loading commands, and fast-transfer commands for the advanced programmer. Here is an example of what it can do: For programs that usually load with a "," ,8,1" command, just hit Shift/Run-Stop. A large spreadsheet program like BUSICALC 3 then loads in about 25 seconds. Through keyboard commands or a hardware "off" switch, you can even return to the old, slow loading method, if for some reason you really want to. Or you can ignore all its commands, and just enjoy the speedy disk operations.
■ It's Serious
But if you are really serious about programming, the 1541 Flash! is a gold mine. For example, the manual will show you how to write software allowing data transfer to and from the disk drive at speeds up to 10 times the normal.
■ It's Easy
Installation of the 1541 Flash! consists of plugging a small assembly inside the Commodore 64 and two small assemblies plug into the Commodore 1541. Except for a small percentage of Commodore 64s, no soldering is required. Assembly instructions include detailed pictures and drawings. And installation is—well, a flash.
■ It's Available
Call Skyles Electric Works to place your order or to get more info on the 1541 Flash! Hurry up, though. They may be gone before you know it.
1541 FLASH! ..... $ 59.95*
1541 FLASH! with Disk Switchboard .. 69.95*
1541 FLASH! for Two Drives 109.95*
1541 FLASH! for SX-64 ..... 69.95*
1541 FLASH! for MSD ..... tba
*There is an additional $3.50 US and Canada, $10.00 Europe and Asia, shipping charge per order. California residents add sales tax.
Skyles Catalogue Page 1

FOR COMMODORE 64 AND VIC-20 OWNERS ONLY:

This is just 1 of 15 pages of the newest and biggest Skyles catalog, hot off the press.

We know you'll want this page, in its full 7 x 10 splendor, and another 14 pages of peripherals, software and books that will make your Commodore 64 or VIC-20 computer even nicer to live with.

So, if we missed sending you your very own copy within the last few weeks, call us at (800) 227-9998, unless you live in California, in which case call (415) 965-1735.

From Skyles Electric Works, the oldest and largest professional specialists in the business.

Skyles Electric Works
231E South Whisman Road
Mountain View, CA 94041
(415) 965-1735

1541 FLASH! is a trademark of Skyles Electric Works.
Commodore 64 is a trademark of Commodore.

a Breakthrough in Value!

ULTRABYTE

DISK DUPLICATORS with FREE BACKUP COPIES

ULTRABYTE NOW OFFERS TWO OF THE BEST COPY PROGRAMS ON THE MARKET, AND BOTH COME WITH FREE BACKUP COPIES.

ULTRACOPY II

Jim Lagerkvist's sequel to the original ULTRACOPY 64 owned by thousands of satisfied customers.

- Copies protected disks in 8 minutes on a single 1541
- Does not "hammer" the disk drive. Will not affect alignment
- Formats, copies and produces errors automatically in one step
- Features Normal Scan for reliable copies of most disks
- Includes Deep Scan with 38 track and half track capability
- Copies 99% of programs on the market
- Free backup copy - two disks for the price of one
- Technical support available by telephone
- Simple to use. Tone signals disk swaps

ULTRABYTE DISK NIBBLER

Uses proprietary revision of disk operating system (DOS) to make a bit by bit copy. This process, called nibbling, copies the format, data and errors, all at the same time. Errors are not recognized and do not hammer the drive. Built in fast load environment allows copies in 8 minutes with a single 1541 disk drive.

- Easy to use. No separate analysis or error production
- Choose 35, 36, 37 or 38 tracks to copy incl. half tracks
- Makes up to 5 copies of each original — (UNIQUE FEATURE)
- Backs up 99% of all software
- Free backup copy - two disks for the price of one

FREE BACKUP DISK

ULTRACOPY II and the NIBBLER are independent products by different authors. Both are excellent and either should meet your needs. You may order two disks of one product for $39.95 plus $4.00 shipping and obtain a single disk of the other for $20.00 plus $3.00 shipping. Sorry, free backup must be same as disk purchased.

$39.95 FOR 2 COPIES OF EITHER ULTRACOPY II OR THE DISK NIBBLER

plus $4.00 shipping and handling. Mastercard, Visa, Check or M.O., Foreign orders or COD add $2.00. Calif. add 6.5% ($2.60) sales tax. Additional backup copies are $20.00 plus $3.00 shipping

ATTENTION: Owners of ULTRACOPY or the NIBBLER whose names are in our file may order a single copy of either product for $20.00 plus $3.00 shipping.

Write or Call 24 Hour Order Line

ULTRABYTE (818) 796 - 0576

P.O. Box 789 La Canada, CA 91011

DEALERS & DISTRIBUTORS WANTED

approximately the angle of your peripheral vision. A number of other constellations and stars are also shown, some with lines joining the stars and others without.

I can read your thoughts. What if you want to look at the sky at a different place or time? You can—the program is replete with options like that and others. For example, the sky can be viewed at any time, date (9999 B.C. to 9999 A.D.), viewing angle, or place on earth. If you want to locate a specific celestial body, like the moon or Venus, the program will locate it for you and center it on the screen. Bothered by the constellation lines? No problem. Out they go. Need more information about prominent objects? Just ask the program, and a moving billboard-like display supplies you with additional data. The options are exercised with the keyboard and/or a joystick from a displayed menu.

In our limited space here, I can highlight only a handful of the many helpful options. One important addition is to allow a printout of the sky display on a Commodore printer (1525 or MPS 801) or emulator. A permanent record is always a nice plus. If you wish, you can make your own sky charts for your area of the country and use them during outdoor stargazing.

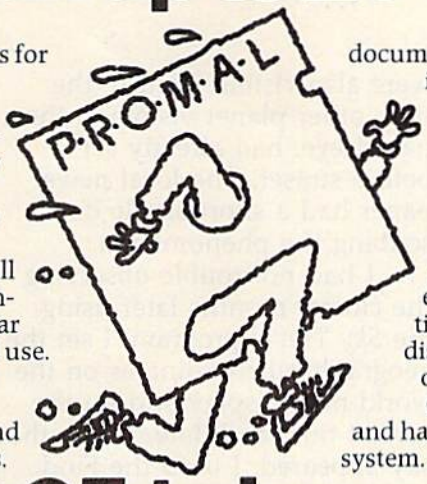
It doesn't take much to make your programs run up to 20 times faster.

If you've been writing programs for your Commodore 64, Apple IIe or Apple IIc in BASIC you can take a giant step forward in speed of execution and in programming productivity for just $49.95.

You can get program performance that you only thought possible from machine language programs. While still using a powerful, understandable high-level language. A language that's similar to Pascal, but much easier to learn and use.

You can create programs with our advanced, full-screen editor–much like you would on a word processor, and it even locates your compilation errors.

And when you compile your programs, you have a fast one-pass compiler, a recursive descent compiler that can compile a 100-line source program in 10 seconds or less.



$49.95 to be exact.

PROMAL™ also gives you an elegant operating system "Executive," which includes powerful file, program and memory management commands and even I/O redirection.

You get all of that with PROMAL–improved programming productivity, faster compile and run time and power that you may never have thought possible.

PROMAL–for the beginning or advanced programmer.

Whether you are just beginning to write or are an experienced programmer, you can be more productive with PROMAL (**PRO**grammer's **M**icro **A**pplication **L**anguage). It's easier to learn than Pascal, C or Forth. It provides you with a full range of powerful structured statements like IF-ELSE, WHILE, REPEAT, FOR and CHOOSE. And, because indentation is part of the language's syntax, it helps you write programs neatly and logically. There are no line numbers to worry about, and since comments don't take up memory space, you can document your programs completely.

COMMODORE 64 BENCHMARK

(Sieve of Eratosthenes)

	PROMAL	BASIC	COMAL	FORTH	PASCAL
Execution Time (secs.)	**30**	630	490	51	55
Object Code Size (bytes)	**128**	255	329	181	415
Program Load Time (secs.)	**3.2**	3.8	6.3	11.2	23.5
Compile Time (secs.)	**8.5**	–	–	3.9	108

PROMAL–a language especially for small systems.

Unlike languages developed for larger systems and squeezed into small systems environments, PROMAL was conceived and developed specifically for the small system. With PROMAL there's finally a language created for the environment in which you work.

Speed up your programs and step up your programming productivity.

You get all of that speed and productivity–with the PROMAL PM-200 "End-User" system (220 pages of documentation and PROMAL system diskette including sample programs) for just $49.95. There's a 15-day, no-risk moneyback guarantee. And the entire $49.95 may be credited against later purchase of the "Developer's Version."

The "Developer's Version"–all the components of the "End User" system plus the "run time" object module generation capability, additional documentation and an unlimited right to sell or distribute PROMAL applications–is only $99.95.

Or–for only $10.00 plus $2.50 postage and handling you can get the PM-100 demo system. It includes a 32-page manual and all the capabilities of the PM-200 except the ability to print or save files to disk. It's a very inexpensive way to explore the wonders of PROMAL.

Our Guarantee: Try PROMAL for 15 days. If you are not completely satisfied, return it to us undamaged and we'll refund your money. No questions asked. Dealer inquiries invited.

For quicker response on credit card orders, call Toll Free: **1-800-762-7874**

In NC: 919-787-7703.

Systems Management Associates
3700 Computer Drive, Dept. GP
Raleigh, North Carolina 27609

Order Form

Please send me my copy of PROMAL

My system is (check one): ☐ Commodore 64 ☐ Apple IIe ☐ Apple IIc

PROMAL Package Desired (check one):

☐ PM-200 (for systems listed above) $49.95 plus $5.00 for shipping and handling at a total cost of $54.95. Satisfaction Guaranteed.

☐ PM-300 Developer's Version $99.95 plus $5.00 for shipping and handling for a total cost of $104.95. Satisfaction Guaranteed.

☐ PM-100 demo diskette $10.00 for the diskette plus $2.50 for postage and handling for a total cost of $12.50. (Non-refundable.)

☐ My check is enclosed. ☐ Please charge my purchase to my ☐ Visa ☐ Mastercard

Card Number _____ Expiration Date _____

Signature _____

Name _____

Address _____

City, State, Zip _____

North Carolina Residents add 4-1/2% sales tax.
Foreign orders add $15.00 additional shipping and handling.

The manual discusses several examples which the new user can try. However, I prefer to use my own as this may give a less biased review. I chose two examples: One, to confirm an unusual arrangement of the planets which occurred recently where I live. Two, to observe again an eclipse of the sun which I remember seeing 15 years ago.

On November 25, 1984, just after sunset in the area where I live, there was an unusual arrangement of four planets around a crescent moon. Three of the brightest natural objects in the night sky (the moon, Venus, and Jupiter) appeared as a brilliant triangle. In addition, Mars and Mercury were also visible. Saturn, the only other planet visible to the naked eye, had already set before sunset. The local newspaper had a short article describing the phenomenon.

I had no trouble observing the cluster months later using the *Sky Travel* program. I set the geographical coordinates on the world map display and set the correct time and date. When the sky appeared, I used the Find command to center the crescent moon on the screen, and there was the cluster almost exactly like the newspaper figure. The only points of difference were that in the *Sky Travel* display, Venus and Jupiter were too close to be resolved, only Jupiter appeared, and the stars and constellations were shown. *Sky Travel* had successfully passed its first test.

On March 7, 1970 my family and I watched a spectacular natural phenomena, a total solar eclipse. At first we watched indirectly using pinholes in paper. Around noon, the moon started its slow journey across the face of the sun. At approximately 1:30 PM, totality was reached, the center of the sun was completely blocked.

I wondered, could *Sky Travel* simulate this memorable event? I set the parameters for the correct date, place, and time. For this example, I had the program scan the clock slowly around the point of totality. The moon slowly swallowed the sun; the sky became like twilight; at totality, the sky was dark. The display showed other features besides the eclipse that I would have looked for if I had this program at that time. For example, Venus was probably visible up and to the left of the moon. *Sky Travel* had successfully passed its second test.

I don't like to be too lavish with my praise, as one might doubt my credibility as an objective reviewer. However, I cannot imagine a better program of this kind. Is it possible that a Commodore 64, a "low end" computer, can do the calculations necessary to predict the night sky thousands of years on either side of the present? Surely this would require a large mainframe costing thousands of times more.

The answer is simple: *Sky Travel* can and does do these predictions in a reasonable amount of time. I verified this by trying the above examples

BACKUP PROTECTED SOFTWARE WITH COPY II 64™

From the team who first brought you **COPY II PLUS** (Apple), **COPY II PC** (IBM) and **COPY II MAC** (Macintosh) comes a revolutionary new copy program for the Commodore 64, **COPY II 64**!

- Copies most* protected software — *automatically.*
- Copies even protected disks in just 3½ minutes.
- Maximum of four disk swaps on a single drive.
- Copies half and full tracks.
- Requires just one 1541 drive on the Commodore 64.

Call M-F 8-5:30 (W. Coast time) with your VISA MC : **503/244-5782.**
Or send a check (add $3 s/h, $8 overseas) to

$39.95

CENTRAL POINT Software, Inc.
9700 SW Capitol Hwy. #100
Portland, OR 97219

* We update Copy II 64 regularly to handle new protections; you as a registered owner may update at any time for 1/2 price! (To update, just send original disk and $20.)

This product is provided for the purpose of enabling you to make archival copies only.

and several others besides. All the examples worked to my satisfaction, but a friend who is an expert in astronomy did find a minor error—the crescent moon was not lined up at the proper angle with the sun. Nitpicking aside, the program performs admirably.

The second question I had was more difficult to answer. Would this program make me or anyone else an expert in astronomy? As the question is phrased, I don't think so. However, if you do the examples carefully, you can learn a great deal about this subject. And, if you print off sky charts and use them, you'll see things in the night sky you missed before. Not an expert, perhaps, but certainly an educated layman.

If you or anyone you know has the slightest interest in astronomy, run out and buy this program. Lavish praise indeed, but, in my opinion, justified.

—Harvey B. Herman

Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380
$34.95 (disk)

COMPUTE!'s
GAZETTE
TOLL FREE
Subscription
Order Line
800-334-0868
In NC
919-275-9809

Raid Over Moscow

Raid Over Moscow may do nothing for U.S.-Soviet relations, but it's an excellent arcade-style strategy game very much in the tradition of *Beach-Head*, an earlier bestseller from Access Software. The basic premise is a nuclear-age nightmare which you must stop: The U.S. has disarmed its nuclear arsenal following further strategic arms limitation talks (SALT IV) between the Soviets and the Americans. The Russians, fearing vulnerability, have hidden nuclear missiles in three Soviet cities—Leningrad, Minsk, and Saratov. Following an escalation of tensions, missiles are launched. Your mission is to destroy the launch sites before missiles reach American cities.

Many fast-action computer games challenge the player to master only one or two kinds of skills. Designer Bruce Carver has included no fewer than five different types of game play, all within the same scenario. Colorful, detailed graphics, well-designed sequences, and subtle strategic elements help make this a very engaging game.

The five game scenarios include piloting your stealth fighter-bombers out of an orbiting space station's hanger, making an attack run against the launch sites, firing at the missile silos, coordinating a commando's attack against the Moscow defense center, and finally trying to destroy the nuclear reactor. You are attacked every step of the way by tanks, missiles, fighter planes, and Soviet soldiers. You're even confronted in the final sequence by armed robots which you must destroy by

ricocheting a disc grenade off of the rear wall of the reactor room and hitting the unprotected back of the robot—four times! Throughout the game, the quality of the 3-D effects are impressive, as are the smoothly scrolling screens and the attention to detail.

One word of warning. Although most of the sequences depict buildings, trucks, tanks, and other objects being destroyed, the attack on the Soviet defense center graphically shows the bodies of soldiers falling to the ground when hit. Parents of young children may find such violence objectionable.

That having been said, it should be emphasized that *Raid Over Moscow* is well-designed and programmed throughout. Of great help is a demo mode which runs through the different sequences. You can take control of the game anywhere in the demonstration to practice your skills. *Raid Over Moscow* is in some ways like playing five different games in one. You'll enjoy the challenges.

—Selby Bateman

Access Software
925 East 900 South
Salt Lake City, UT 84105
$39.95 (disk)

SIMPLE ANSWERS TO COMMON QUESTIONS

Tom R. Halfhill, Staff Editor

Q A

Each month, COMPUTE!'s GAZETTE tackles some questions commonly asked by Commodore users and by people shopping for their first home computer. If you have a question you'd like to see answered here, send it to this column, c/o COMPUTE!'s GAZETTE, P.O. Box 5406, Greensboro, NC 27403.

Q. Is it wise to completely fill up a disk? Does that make the programs search and load any slower?

A. Filling a Commodore floppy disk to near-capacity does not significantly slow down the searching and loading process. That's because the disk drive does not have to search the disk *sequentially*, as the Datassette does when it searches for a file on cassette. The Datassette is hampered because files are stored end to end, one after the other. It must wind the tape past all the files at the beginning of the tape to find the ones that follow.

But on a disk, the files are stored in small pieces called *sectors*. All of the sectors are indexed by a *block allocation map*, or BAM. This map keeps track of which sectors on a disk are currently being used to store files. When you enter a SAVE command, the disk drive consults this map to find unused sectors where it can put your program. Then it writes the program name into the directory, with information about where the program was saved. If the program is longer than one block, the disk drive looks for another free sector and writes the second sector's address at the beginning of the first sector.

When you load a program, the disk drive searches through the directory, trying to match the name. When it finds a match, it also finds the location of the first sector and jumps there. The first sector points to the second, the second to the third, and so on. The drive jumps back and forth from sector to sector, reading the program and sending it to the computer. It ignores sectors which do not belong to the file. This method is called *random access*.

Since the disk directory is stored sequentially, it may take a fraction of a second longer to load a program at the bottom of the list. The disk drive has to first look at the program names at the beginning. But once the name is found, programs load at about the same speed.

Often, however, not all of the sectors belonging to a file will be contiguous. That is, the file may be stored in blocks of sectors which are scattered all over the disk. This system might seem illogical, but it's actually the most efficient way to use disk space. Otherwise, there would be gaps of unused space throughout the disk where you deleted short files. To keep from wasting this space, the disk drive saves pieces of longer files in the gaps and then keeps track of where everything is by using the sector pointers.

This means that a nearly full disk which has been heavily used (many files deleted and saved) *will* slow down the searching and loading process a trifle. You can hear this for yourself when the disk drive is loading a long file; if you listen closely, you'll notice the read/write head skipping from place to place as the drive accesses the scattered sectors. However, the slowdown is not significant—probably less than one second in total.

If you wanted, you could clean up a disk with many noncontiguous sectors simply by copying each file one by one to a fresh disk. But the labor involved probably wouldn't be worth

the second of loading time you might save. (Note that a copy program which duplicates a disk sector by sector would simply recreate the original disk, noncontiguous sectors and all.)

There is one way a full disk is significantly slower than a near-empty disk: when listing disk directories. Unlike most floppy disk systems, Commodore disks treat directories as program files—calling a directory is just like loading a program. (That's why the directory wipes out whatever program you had in memory, unless you're using a special utility such as the DOS Wedge.) A full disk usually has many more files, so the lengthy directory takes longer to load than a short directory.

But there's a more important reason why you should avoid filling a disk to capacity. We've noticed that full disks seem more trouble-prone than disks which aren't crammed to the gills, especially when the disks are swapped among several different drives. This is partly because data is recorded on a disk in 35 circular rings called *tracks*, starting from the edge and progressing toward the center. Commodore 1541 disk drives are sensitive to head alignment problems, and sometimes they have difficulty reading the innermost (or outermost) tracks. To be safe, we usually start with a fresh disk when a disk gets about 90 percent full.

Q. In a recent issue of COMPUTE!'s GAZETTE I saw an ad for the Commodore B128. The ad states that the unit is a 128K, 80-column computer with an 8050 dual disk drive that stores one megabyte. I have never seen these two items on the market. Is there such a model, and if so, why isn't it more popular? I would think that it would be. I would also like to know if there is any third-party support.

A. Yes, there is such a system as the Commodore B128 and 8050 dual disk drive. The advertisement correctly listed the specifications, too. Yet, it's also not unusual that you've never seen these models on the market. They have a rather odd history that dates back a couple of years.

At the National Computer Conference and Summer Consumer Electronics Show in June 1982, Commodore pulled out all the stops and announced a lineup of five new computers—ranging from a low-end videogame computer at $179 to a high-end business computer at $2,995. But as it turned out, only one of these computers ever made it on the U.S. market in significant numbers—the Commodore 64 (originally priced at $595).

Among the computers which never quite made it was the B128. As first announced, it had 128K Random Access Memory (RAM), expandable to 256K internally and 640K externally (896K total); a 6509 chip for the central processing unit (compatible with the VIC and 64's 6502/6510); the same SID synthesizer chip found in the 64; 80-column text mode, but no high-resolution color graphics; a built-in tilt-and-swivel monitor; built-in dual floppy disk drives; RS-232 serial and IEEE-488 parallel interfaces; a cartridge slot; Microsoft BASIC; detachable keyboard; and optional Z80 and 8088 microprocessor boards for CP/M and CP/M-86 compatibility. The tentative price was $1,695.

As you can see, this is similar but not identical to the B128 now being advertised (although a few of the original configurations have been reported in Europe). The built-in monitor and dual floppy disk drives have been subtracted, and the detachable keyboard has been combined with the system unit to form a one-piece console. The original keyboard layout (with a generous 94 keys) has been retained. The computer still has 128K RAM, but there's no mention of expandability or optional microprocessor boards. A few other specifications were changed, too.

To our knowledge, only about 20,000 B128s were ever manufactured, approximately 14,000 for the U.S. market. Essentially, the ad you've seen is a closeout sale. To make up for the missing monitor and disk drives, the advertiser is tossing in a separate monochrome monitor and Commodore 8050 dual disk drive. The 8050 is a very high capacity drive originally made for the Commodore PET series computers. It's much faster than a 1541 drive because it connects to the IEEE-488 port, a parallel interface (see last month's column). The advertised system also includes a Commodore 4023 printer and other miscellaneous items for a total price of $895.

Notice that this is about half the original list price for a B128. In fact, the original list price of the 8050 drive alone was $1,795. In terms of hardware, then, it's a hard deal to beat.

But remember that the B128 is not in production and only a relatively small number exist. Aside from the word processing and business programs offered by the advertiser, it's unlikely that any new programs will be developed by software publishers. The only alternative is to write your own, although we've heard that someone in Europe has a program that lets the B128 run most software developed for the Commodore PET 8032.

Consider if the available software is sufficient for your purposes, or if you can write the programs you'll need, before making a decision to buy the B128. If you happen to already have a PET, the deal might be worth it just for the 8050 disk drive.

Michael S. Tomczyk

GOTO And GOSUB:
Two "Messenger" Commands

I once had a good friend at Commodore who had a great way of introducing bad news. First he'd deliver the terrible news. Then when everyone went into a panic, he'd raise his hands in surrender and say, "Hey, I'm only the messenger—don't shoot the messenger!"

This month we're going to take a beginner's look at two BASIC commands that are sort of like messengers. The commands are GOTO and GOSUB, and they both tell the computer where to go.

The Indispensable GOTO Command

It's hard to write even a simple program without using the GOTO command. GOTO does just what it looks like it does—it tells the computer to *go to* a specific line in a BASIC program. You can use it to send the computer backwards or forwards to a *different* line in the program, or you can tell the computer to go back and repeat the *same* line. Here's a short example that makes the computer repeat the same line over and over in an endless loop:

```
10 PRINT "ENDLESS":GOTO 10
```

Enter this line, then type the word RUN and press RETURN. The computer responds by printing the word ENDLESS over and over in a continuous series called a *loop*. To stop the loop, press the RUN/STOP key.

In our example, we begin by printing the word ENDLESS on the screen. The colon (:) is always used to separate two or more BASIC statements used on the same program line.

The phrase GOTO 10 tells the computer to "go to line 10." Thus, when you run this line, the computer responds by displaying the word ENDLESS, then goes back to the same line and prints the word again, and keeps going back in an endless loop until you stop it.

Here's another version of the same example, with the GOTO command on a different line:

```
10 PRINT "ENDLESS"
20 GOTO 10
```

The GOTO command is also used in certain types of *counters*, as in this short example:

```
10 X=X+1: PRINT X;:FOR T=1 TO 100: NEXT
20 GOTO 10
```

Line 10 starts by defining X. If you did not previously give a value to X, it automatically equals 0. This is true of any variable. If we add 1 to zero, the new value is 1. Therefore, X=X+1 is

Michael S. Tomczyk is a former Commodore marketing executive and product designer. His recent book, The Home Computer Wars, *describes the rise of Commodore and is published by COMPUTE! Books.*

the same as X=0+1, which is the same as X=1. So X=X+1 starts out by defining X as the number 1. Until it is redefined, the variable X is the same as the number 1.

PRINT X displays the value of X. Since X equals 1, the number 1 is displayed.

The semicolon (;) causes the numbers to display horizontally. If you remove the semicolon, the numbers will be displayed in a vertical column on the left edge of the screen.

The last part of the line (FOR T = 1 TO 100: NEXT) has nothing to do with counting. This section is a time delay loop which slows down the program. You can insert a FOR–NEXT loop almost anywhere in a BASIC program to slow it down. We used the time delay loop here so the computer pauses briefly after each number is displayed. Otherwise the numbers would zoom across the screen, too fast to read.

Line 20 contains the GOTO command, which sends us back to line 10. But this time when we go back to line 10, the variable X already equals 1, so when we add 1 to X, it's the same as adding 1 to 1. That equals 2, so on the second pass of the loop, PRINT X displays the number 2. The next time the program loops around, X increases to 3, then 4, 5, 6, and so on. That's how a *counter* works.

Don't forget—press RUN/STOP to break out of the counting loop.

Using GOTO To Repeat Programs

One of the most important uses of the GOTO command is in repeating a program or program section after it's run through. This requires that you set up some sort of signal or flag, which activates the GOTO command and repeats the program. Let's look at some different types of end-of-program repeat signals.

We've already been using the automatic repeat function by simply putting the GOTO at the end of the program. You can also cause a program to repeat a specified number of times by wrapping it in a FOR–NEXT loop. To do this, put the FOR part of the loop at the beginning of the section to be repeated and the NEXT command at the end of that section. Here's an example:

```
10 FOR X=1 TO 10
20 N=N+1
30 PRINT "{CLR}HOW MUCH IS 5 TIMES";X: IN
   PUT A
40 IF A=(5*X) THEN PRINT "CORRECT!": C=C+
   1: FOR T=1 TO 500: NEXT
50 IF A<>(5*X) THEN PRINT "WRONG-TRY AGAI
   N.": FOR T=1 TO 500: NEXT: GOTO 20
60 NEXT
70 PRINT C "CORRECT ANSWERS": PRINT " IN"
    N "TRIES"
100 REM: PROGRAM CAN END OR CONTINUE HERE
```

This program is a very crude educational drill which asks a student to multiply the number 5 times 1, 2, 3, and so on up to 10. You could dress up this skeleton program with sound effects, graphics, better spacing, etc., but we'll use it in its present form to demonstrate several programming techniques, including the GOTO command.

Line 10 begins with the FOR part of a FOR–NEXT loop. The loop ends with the NEXT command in line 60. Everything between the FOR and NEXT parts of the loop will be repeated ten times. This is important. You can cause a command or even a whole section of program to repeat or recycle several times by putting it inside a FOR–NEXT loop. You can increase or reduce the number of times the program repeats itself by changing the number 10 in line 10.

Line 20 is the counter which we just discussed. Remember, N starts with a value of 1 and increases each time the program cycles through.

Line 30 displays a prompt message and requests an input. The INPUT command automatically displays a question mark. Putting a semicolon at the end of the PRINT message causes the question mark to appear immediately at the end of the message—otherwise it would appear on the next line down. The answer which is typed in by the program user will be assigned by the computer to the variable A.

Lines 40 and 50 contain IF–THEN statements which set up two *conditions* and tell the computer how to respond. Line 40 prints the CORRECT message if the answer is right—in other words, if the typed-in answer (A) does in fact equal 5 times X. It also uses the variable C as a counter of the correct answers.

IF the answer does not equal 5 times X, THEN a WRONG message is displayed. Note that the "not equal to" sign is created by using the greater than (>) and less than (<) signs together as shown in line 50.

Both IF–THEN statements have a time delay loop at the end of the line, which leaves the message on the screen long enough to be read.

The message in line 50 also includes a GOTO command at the end of the line which, if the answer is wrong, sends the computer back to repeat line 20. This GOTO command causes the program to keep repeating until the user gets the answer right.

Line 60 contains the NEXT command, which wraps up the section we are repeating, and line 70 prints a report of the student's performance on the drill.

Line 100 does nothing in our example. You

can end the program here after it completes its ten repetitions, or you can continue the program. If you continued the program at this point by adding more lines, it will automatically continue after the question is asked the tenth time.

Before we go on, you may want to save the previous program on disk or tape, then type NEW and press RETURN to erase it from your computer's memory to get ready for the next example.

Combining GOTO And GET$

Another type of end-of-program signal allows the user to control whether the program is repeated or continued.

The following program demonstrates how to let the user repeat or continue a program just by pressing a single key.

```
10 PRINT "{CLR}TYPE A NUMBER AND": PRINT
   "PRESS RETURN": INPUT A
20 PRINT "TYPE A SECOND NUMBER": PRINT "A
   ND PRESS RETURN": INPUT B
30 FOR SP=1 TO 10: PRINT: NEXT
40 PRINT "HIT ANY KEY TO": PRINT "REPEAT
   THIS PROGRAM."
50 GET K$: IF K$="" THEN GOTO 50
60 GOTO 10
```

The important lesson here is that this program lets the user repeat the program by pressing any key on the keyboard.

Lines 10 and 20 are self-explanatory.

Line 30 uses a FOR–NEXT statement to insert ten blank lines—actually, it inserts ten PRINT statements, and using the PRINT statement by itself inserts a blank line on the screen when the program runs.

Line 40 contains a prompt message which tells the user what to do next.

Line 50 tells the computer to get a key—in other words, GET K$ tells the computer to watch for any key to be pressed. It follows this key-sensing command with an IF–THEN statement which tells the computer that if a key is *not* pressed, then go back to line 50 and keep looking. The double quotation marks with nothing in between mean "null" or "nothing." If a key is not pressed, then an endless loop is created and the computer keeps looking for a key to be pressed with no result. As soon as a key is pressed, however, the program drops through to the next line.

Line 60 contains a GOTO command because we want the program to repeat. If we wanted the program to continue instead of repeat, we would change lines 40–60 as follows:

```
40 PRINT "HIT ANY KEY TO": PRINT "CONTINU
   E."
50 GET K$: IF K$="" THEN GOTO 50
60 REM: PUT REST OF PROGRAM HERE
```

Using The GOSUB Command

If you want to jump to a line or section of your program and use that section several times, that's where the GOSUB command comes in handy. You can jump down and get a random number, for instance. Or a sound effect. Or even a time delay.

If you're using a lot of the same time delays in your program, you may want to use GOSUB to avoid having to repeat the entire delay loop every time. Here's an example that uses one of my favorite Hemingway quotes:

```
10 PRINT "{CLR}COURAGE": GOSUB 100
20 PRINT "IS": GOSUB 100
30 PRINT "GRACE": GOSUB 100
40 PRINT "UNDER": GOSUB 100
50 PRINT "PRESSURE": GOSUB 100
60 END
100 FOR T=1 TO 400: NEXT: RETURN
```

This example prints each word, then uses the GOSUB command to jump down past the end of the program to line 100 which contains a FOR–NEXT time delay loop. The line (or lines) that the GOSUB jumps to is referred to as a *subroutine*. The RETURN command at the end of the subroutine in line 100 sends the computer back to continue where it left off. Thus, in this program, the computer prints a word, jumps down to the time delay, jumps back for the next word, and so on until the program ends in line 60.

Although the END statement is usually optional, it's necessary in the program above. To see why, delete line 60 and run the program again. After the last word is printed, the computer will crash with a ?RETURN WITHOUT GOSUB ERROR message. This happens because after the computer finishes executing the main part of the program at line 50 it moves into the subroutine at line 100, even though you don't really want line 100 to be executed at that point. You must always have an END or some other statement to separate your subroutines from the main part of your programs.

Here's another example involving random numbers:

```
10 PRINT "{CLR}MULTIPLY TWO RANDOM": PRIN
   T "NUMBERS": PRINT
20 GOSUB 100: PRINT "THE FIRST NUMBER IS"
   : PRINT R: K1=R: PRINT
30 GOSUB 100: PRINT "THE SECOND NUMBER IS
   ": PRINT R: K2=R: PRINT
40 PRINT K1 "TIMES" K2 "EQUALS": PRINT K1
   *K2
50 END
100 R=INT((RND(1)*100)+1): RETURN
```

Line 10 opens by clearing the screen and displaying the opening title. The PRINT command by itself inserts a blank line on the screen.

Line 20 opens by jumping down to line 100 to define a random number between 1 and 100. That number is defined as a variable called R. We then print a message with the random number (R) at the end of the line. Finally, since we want to save that number for use later, we create a new variable K1 and make that equal to R. We have to do this because R is going to change when a new random number is defined.

Line 30 is the same as line 20, except here we get a new random number. To save this number, we create a new variable called K2.

Line 40 uses a PRINT statement to display both random numbers as part of a message, then multiplies the two random numbers together (K1*K2) to get the result, which is displayed on the screen. Note we must go outside quotation marks to print the variables, but inside quotation marks to print the rest of the message.

Line 50 is the end of the program.

Line 100 contains the subroutine, which defines a random number between 1 and 100, then returns to continue the program where it left off.

An Explosive Sound Effect

Finally, for you Commodore 64 owners, here's a GOSUB example which includes an explosion sound effect. Owners of other Commodore computers can substitute any sound effect for lines 100–110.

```
10 PRINT "{CLR}THE": GOSUB 100: PRINT
20 PRINT "HOME": GOSUB 100: PRINT
30 PRINT "COMPUTER": GOSUB 100: PRINT
40 PRINT "WARS": GOSUB 100: PRINT
50 END
100 POKE 54296,15: POKE 54276,129: POKE 5
    4277,14: POKE 54272,149: POKE 54273,6
    8
110 FOR D=25 TO 0 STEP-1: POKE 54296,D: N
    EXT: POKE 54276,0: RETURN
```

Given the fireworks at Commodore which are described in my book, it seemed appropriate to accompany this example with at least some small explosions.

Line 10 clears the screen, prints the word THE and GOSUBs to lines 100–110 for the sound effect. Then it returns and a blank line is printed.

Lines 20–40 work the same as line 10.

Line 50 ends the program.

Lines 100 and 110 contain the sound effect settings. If you're interested in what each POKE value means, I suggest consulting the *Commodore 64 User's Manual* or *Programmer's Reference Guide*.

kyan

PASCAL

For the Commodore 64!

NOW kyan has ... TWO Compilers!

STANDARD kyan pascal is perfect for students. It is easy to use and helps students learn the Pascal language.

STANDARD kyan pascal features:

- Built-In Full Screen Text Editor;
- Resident Editor/Compiler to Eliminate Disk Swapping;
- MERGE and Other File Management Functions;
- Stand-Alone Runtime Environment;
- Code that Runs Up to 40 Times Faster than BASIC;
- HELP menu and Full Set of Error Messages; and,
- Tutorial Manual with Sample Programs.

ADVANCED kyan pascal is designed for the more experienced Pascal programmer. It contains all the features of STANDARD ***kyan pascal*** plus the additional capabilities and extensions demanded by professional programmers.

ADVANCED kyan pascal features:

- Optimized Machine Code Compiler (Runs 8 Times Faster than P-code Compiler);
- Built-In Assembler (Allows Full Hardware Control);
- String-Handling and Random Access Files;
- ALIAS Procedure to Assign File Pathname;
- INCLUDE File Plus DISPOSE and CHAIN Procedures;
- Special Procedure Prints Assembly Language Code;
- Enhanced Graphics and Text Editing Capabilities; and,
- Expanded Manual and Reference Guide.

Both versions of ***kyan pascal*** are full implementations and require only a single disk drive. And, both come with kyan's MONEY BACK GUARANTEE...***If you are not completely satisfied, return it within 15 days for a full refund of the purchase price.***

STANDARD kyan pascal ***$49.95***

ADVANCED kyan pascal ***$69.95***

(Add $4.50/copy for handling; $12.00 outside North America; California residents add 6.5% sales tax)

Send Check/Money Order to: ***kyan software,*** Dept. S
Call: (415) 775-2923 1850 Union St., Ste. 183
MC/Visa Accepted San Francisco, CA 94123

ADVANCED kyan pascal is also available for the Apple II and Atari family of computers.

Richard Mansfield, Senior Editor

ML Mailbag

Here are answers to some of the letters we've received recently. If you have a question about machine language programming, write to: ML Mailbag, COMPUTE!'s GAZETTE, P.O. Box 5406, Greensboro, NC 27403. Due to the volume of mail, we regret that we are unable to reply personally to individual letters.

Can ML Go Anywhere?

Can RAM memory locations 2048–40959 (normally used for BASIC programming) hold a machine language (ML) program?

Yes, any RAM can hold an ML program, but there are a few things to look out for:

1. BASIC uses memory in a dynamic way. For one thing, it stores strings in the highest available RAM memory it can find. So, to protect your ML program, the common solution is to "fool" BASIC into thinking that there's less RAM memory than really exists.

To do this, you can POKE 56, PEEK (56) − (X / 256 + 1), which will lower the "available memory" by X bytes. Just replace the X with the size of your ML program. (Address 56 holds a top-of-memory pointer which changes in steps of 256 bytes.)

2. However, if you aren't going to be using any BASIC, it's not necessary to protect the ML program. Just LOAD "NAME",8,1 and SYS to the ML. Use LOAD "NAME",1,1 if you own a Datassette. (The final 1 on the LOAD command causes the ML program to be loaded in at the address from which it was originally saved. Without the ,1 all programs load in at the start-of-BASIC default address.)

3. Whereas a BASIC program always starts at the same place in RAM, an ML program can be located anywhere. So you need to know the address where the ML program begins to be able to start it running with a SYS to that address.

4. On the 64, there's a nice chunk of RAM which is already protected by the computer from any kind of overlay or invasion by BASIC: 49152–53247. Many people like to put their programs there. Also, 828–1019 is safe if you don't use a Datassette.

Making DATA

How are assembly listings turned into DATA statements?

There are two ways. Doing it the hard way, you PEEK each byte from the start to finish of your ML program. When you know the value of each byte, you can then type each one into DATA statements. The easy way is to give the program below (for the VIC or 64) the starting and ending addresses of your ML program and type RUN. It will build the DATA statements for you automatically. Then, as a kindness, it deletes itself, leaving only the DATA statements.

Datamaker

```
1 INPUT "STARTING ADDRESS";S:INPUT"ENDING
   ADDRESS";F
2 PRINT"{CLR}{2 DOWN}":FORI=STOS+47STEP6
3 IFI>FTHENNEXT:PRINT"GOTO7":GOTO6
4 PRINTI;"DATA";:FORJ=ØTO5:R$=STR$(PEEK(I
  +J)):PRINTRIGHT$(R$,LEN(R$)-1);",";
5 NEXTJ:PRINTCHR$(2Ø):NEXTI:PRINT"S="S+48
  "{LEFT}:F="F"{LEFT}:GOTO2"
6 POKE198,9:FORK=1TO9:POKE63Ø+K,13:NEXTK:
  PRINT"{HOME}":END
7 PRINT"{CLR}{2 DOWN}":FORM=ØTO8:PRINTM:N
  EXTM
8 POKE198,9:FORK=1TO9:POKE63Ø+K,13:NEXTK:
  PRINT"{HOME}":END
```

What's A Checksum?

What is a checksum? How does it work?

It's a way of finding out whether or not data (bytes, files, programs, whatever) was sent with-

out becoming corrupted. Checksums are used in telecommunications, during disk or tape access, and even by our own MLX program to make sure that what you get is what was sent.

There are several checksum schemes, but here's how a simple one would work:

You want to send the numbers 1 2 3 4 5 6 to the disk drive. So you send 1 2 3 4 5 6 21 (note the extra number on the end which is the sum of all the numbers you are sending). As it receives the numbers, the disk drive adds them up. Then, it *checks* its *sum* against the one you sent. If they match, no problem. If not, a LOAD ERROR results.

Obviously this method won't catch transposition errors since the sum of 6 5 4 3 2 1 will be the same as 1 2 3 4 5 6. But it's fairly reliable. Other methods are more sophisticated and can eliminate nearly any errors. No information, however, is totally noise free, even with checksums.

I have a VICMON monitor, and when I try to disassemble a program, sometimes the results look like this:

```
1005 ???
1006 INY
1007 ???
```

What do the question marks mean?

A disassembly is to ML what LIST is to BASIC. It lets you see the program and check for errors.

Disassembly is achieved using a special program called a *disassembler*, which looks at a series of numbers in memory and figures out what they represent as ML instructions. This is the opposite of what an *assembler* does: With it, you type in instructions and the assembler translates them into the pure numbers that the 6502 chip can execute as an ML program.

Every ML instruction can be translated into a number, but not every number translates to an instruction. When a disassembler comes across a number that it doesn't recognize as an instruction, it prints question marks.

If your disassembly results in ???, there are two possibilities. First, you might be looking at RAM memory where no ML program exists. In this case, some of the numbers might translate into ML instructions and others won't. Thus, you'll see ??? interspersed with valid instructions (see example above), but the whole thing will be nonsense. You can recheck your starting and ending address for the ML program to point the disassembler to the actual ML program.

The other possibility is that you've come upon a *data table* within an ML program. Most word processors, spreadsheets, and even BASIC itself are written in ML. Somewhere within these ML programs (usually at the very end), there will be lists of error messages, prompts, etc., which are used by the program. These messages, of course, will not disassemble since they are not a list of ML instructions (a program proper), but rather are raw data.

To see this, try disassembling at address 41118 (49310 on the VIC) and you'll see BASIC's data table list of its own keywords. It will give you lots of ??? because it won't make any sense to a disassembler. Other sections of the BASIC ROM, however, will disassemble normally (and you can learn a good deal about ML by trying to figure out how BASIC performs various tasks).

In your book, you say that BASIC's FOR T = 1 TO 100 STEP 2 can be translated into ML with something like the following:

```
      LDX #1
LOOP  INX
      INX
      CPX 100
      BCC LOOP
```

But what if I wanted to use three variables in the statement, like: FOR T = A TO B STEP C. If A, B, and C are always changing in the program, how could I write this in ML?

You will want to set up some variables in your ML program. It's pretty similar to the way variables are defined in BASIC. Most assemblers allow you to set aside memory for this purpose by using the .BYTE instruction. (On a simple assembler, you'd have to keep track yourself of which addresses you're using, but it's the same idea.) Here's how:

```
FORNEXT LDA A
        CMP B
        BCC STEPS     (if A is still lower than B,
                       keep STEPing)
        JMP FINISH    (otherwise, the routine
                       ends)

 STEPS LDX C          (get the number of STEPs
                       to perform)
 STEP1 INC A
        DEX           (count down 1)
        BNE STEP1     (have we finished this cy-
                       cle of STEPing?)
        JMP FORNEXT(when done with cycle,
                       see if A is yet = B)
FINISH RTS            (return to wherever we
                       came from)

A .BYTE 0   (hold the variable A in this byte)
B .BYTE 0   (hold the variable B in this byte)
C .BYTE 0   (hold the variable C in this byte)
```

This routine has to be a bit more complicated than the one where the STEP size remains constant. Here, we set up a little routine to handle the various possible STEP sizes. Of course, other places in your program would set up the values of A, B, and C before you entered this FOR/NEXT ML routine.

Dynamic SID Editor

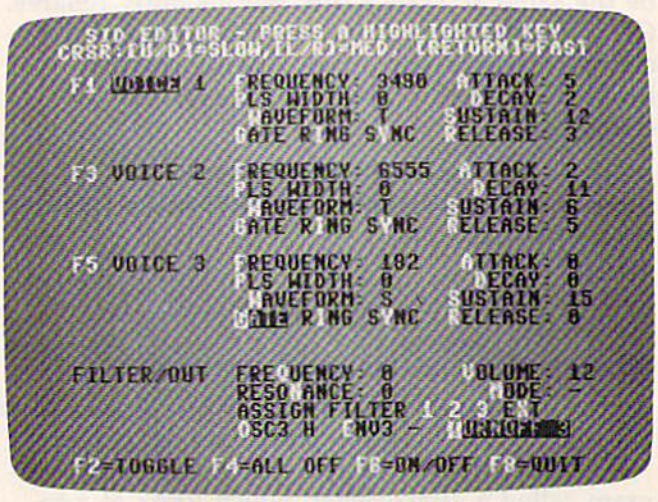
Wayne Eastwood

A host of tedious POKEs and PEEKs are necessary to use the 64's SID chip. This utility provides a menu which lets you instantly select SID values, and see and hear the changes.

The SID, or Sound Interface Device, of the Commodore 64 is a very sophisticated, versatile computer chip. Unfortunately, its sophistication is not readily apparent with the numerous PEEKs and POKEs required to use it.

The *User's Manual* which accompanies the computer is almost no help. The *Programmer's Reference Guide* is much more thorough, but we still must come to grips with the multitude of POKE statements.

"Dynamic SID Editor" takes away the worry about what value goes into which register. It displays a complete log of what is where in the SID at any given moment, and allows you to alter any parameter you wish. All changes take place before your eyes (and ears).



Experimenting with envelopes, waveforms, and filters.

Changing Values In The Menu

After entering and running the program, a full-page menu appears with all SID's registers set to zero and the editor set for Voice 1.

To change a parameter of Voice 1, press the highlighted letter of the desired parameter; for example, F for frequency, G for gate, etc. To change voices, press one of the function keys highlighted in the voice area of the display. To alter the volume or one of the filter parameters, again simply press the highlighted letter. (The filter and volume will function no matter which voice is selected.)

There are three modes of parameter changes the editor will address:

Mode 1. Some parameters are either on or off. For example, if you're set for Voice 2 (f3 was pressed) and press G (for gate), the gate for Voice 2 will turn off if it was on and on if it was off. The editor will display the word "gate" in inverse when the gate is on.

The gate, ring, and sync parameters of each voice work this way, as well as the filter assignment to each voice and the "turn off 3" switch.

Mode 2. Some parameters give you a choice of options. For example, if you are set for Voice 3 (f5 was pressed) and press W (for waveform), the editor will cycle through the possible options and display the selection currently in effect.

The waveform for each voice, the filter mode, and the envelope and oscillator outputs work in this manner.

Mode 3. Most parameters allow a wide range of values from 0 to some maximum level. Frequency, pulse width, the ADSR envelope, resonance, and volume will operate over a range of values. To access this mode, press the highlighted letter of the desired parameter. The word containing the letter will now be displayed in inverse.

Four keys now control the parameter's value:

1. The SHIFT key when pressed causes the increment value to be positive. When not pressed, the increment value is negative.
2. The CRSR–UP/DOWN key sets an increment value of 1.
3. The CRSR–LEFT/RIGHT key sets an increment value of 29.
4. The RETURN key sets a large increment value, larger for large parameter values, smaller for small. This allows quick changing of parameter values and helps compensate for the logarithmic effect of pitch changes.

For example, if Q were pressed (for filter frequency), the word "frequency" in the filter area of the display is displayed in inverse. Pressing SHIFT and either CRSR–UP/DOWN, CRSR–LEFT/RIGHT, or RETURN increments the value displayed.

Program Operation

Keypresses are detected by PEEKing location 203. A value other than 64 indicates a key was pressed. The value determines which key.

To aid in screen display, the PLOT routine in the KERNAL is used, called by SYS MOVE. This routine is read in by lines 50000–50030.

Lines 200–370 are used by mode 3 when a parameter larger than eight bits is required (frequency, pulse width, etc.). It uses variables throughout to increase speed. More statements per line and removing the REMarks will increase speed a bit. Line 260 calculates the next value.

Lines 400–490 are used by 8-bit parameters in mode 3, such as volume. Since the value range is from 0–16, the increment value is always 1. Otherwise, operation is the same as lines 200–370.

Lines 700–830 decode and encode the bits describing a parameter from the byte which carries it.

Lines 900–950 are the cursor plotter.

Lines 1100–1810 make up the key-evaluating routine. If an illegal key is pressed, SID buzzes.

Lines 2000–3060 adjust variables to manipulate the specified parameter.

Lines 4000–4190 manipulate the myriad parameters contained in the SID control byte.

Lines 5000–5550 do for the filter what lines 4000–4190 do for the control byte.

Lines 6000–6996: SID makes available the envelope and wave shape of Voice 3. To make use of these in any way with BASIC is difficult. A short routine read in by lines 50040–50060 and activated by line 50600 puts a SID reading routine into the interrupt stream. The routine checks, 60 times per second, two zero-page locations. If the locations are flagged by the editor, the routine places the current value of the specified parameter into Voice 1 pitch low byte, Voice 1 pitch high byte, or filter frequency high byte.

Of course, the values could be placed in other voices as well, but for simplicity these were the options chosen.

To select, press O or E. You then step through the options. *Note: When you turn off these options (indicated by a - in the display) SID is left with the last value read in the affected bytes. To return to the values displayed, press the space bar.*

Lines 7000–7200 evaluate the various function keys as displayed on the bottom of the screen. Pressing f8 shuts down the editor by turning SID off, restoring the interrupt stream, and clearing the keyboard buffer. If you exit in any other way, enter the following commands:

```
POKE SID+24,0
SYS CS
```

Remember: To make a sound, the volume must have a non-zero value (usually 15) and a voice must have some waveform, some non-zero value in attack, decay, and/or sustain, and the gate must be turned on. If a pulse waveform is selected, there must be a non-zero value in pulse width.

See program listing on page 134.

THE CARTRIDGE BACKUP SYSTEM
FOR THE COMMODORE 64®

The SOLUTION to all of your cartridge problems is the Cartridge Back-Up System (CBUS) for the Commodore 64.

The **CARTRIDGE BACK-UP SYSTEM (CBUS)** consists of two hardware components and very friendly software on a diskette.

The two hardware components are:

1. **CBUS-I** – the **"SNAPSHOOTER"** that takes electronic pictures of cartridge software and stores them on disk. Our **CBUS "AUTOSAVER"** permits anyone to do this automatically.
2. **CBUS-II** – is a true cartridge emulator. The unique **CBUS-II** (patent pending) permits you to run all standard cartridge software stored on disk by use of **CBUS-I** or equal.

A **CBUS SOURCE DISK** is provided. This contains very friendly software. The **CBUS AUTOSAVER** permits anyone to automatically copy cartridge software to disk and also updates the Directory. The cartridge software (on disk) can be selected from the **CBUS** menu using the keyboard or joystick. Programming knowledge is NOT required, however, a comprehensive set of manuals are provided for those who want to know how it works.

CBUS is the only system which permits the storing of ALL standard cartridge software designed for the Commodore 64 on disk and running software from disk. **CBUS** does NOT "crack" the software. The unique **CBUS-II** can emulate all of the standard cartridges, thus the software runs the same as in the original cartridge.

CBUS $119.95
(Includes CBUS-I, CBUS-II and CBUS SOURCE DISK)
Additional CBUS-II's are available for ..... $ 84.95

R.J. Brachman Associates, Inc.
P.O. Box 1077, Havertown, PA 19083
ORDERS ONLY — 1-800-CBUS-C64
TECH INFO — (215) 622-5495
Commodore 64 is a registered trademark of Commodore Electronics, Ltd.

Screen Assistant

Jay Bromley

If you've discovered a clever timesaving technique or a brief but effective programming shortcut, send it to "Hints & Tips," c/o COMPUTE!'s GAZETTE. If we use it, we'll pay you $35. Due to the volume of items submitted, we regret that we cannot always reply individually to submissions.

There's a well-known story about a stolen letter. The police thoroughly search the villain's apartment for the letter, but fail to find it. Finally, a detective walks in and looks for the purloined letter in a box of mail, reasoning that the best place to hide something is in plain sight.

What's the most usual thing about a Commodore computer, something you tend to ignore? And what unusual things can we discover there?

Putting Things On The Screen

No matter what you do with the computer, you probably spend a lot of time looking at the screen of your television or monitor. Chances are, you know of two ways to put characters on the screen: PRINTing and POKEing.

What kind of ordinary things does the screen do? For one thing, you probably take screen scrolling for granted. Turn on the computer, press some keys, and eventually the screen fills with characters. At some point, the cursor moves to the bottom. Type more, press RETURN, and the letters on the screen all move up. You expect it to happen, it's a very ordinary occurrence.

Now think about scrolling for a moment. The computer copies line number two to line one, line three to line two, line four to line three, and so on. And the bottom of the screen is cleared.

So there's a general scroll routine hiding in the operating system, with a subroutine for copying lines and a routine to clear a screen line. These routines and subroutines are available to you, for your own programs.

Screen Lines Versus Logical Lines

A Commodore 64 has 40 columns and 25 rows. Each of the 25 rows is a *screen line*, starting at the left edge, ending at the right.

When you're writing a program, you can enter up to 80 characters per line (88 on a VIC). These program lines are called *logical lines*. Logical lines can take up one or more screen lines when you list a program.

There's a table in memory that keeps track of which screen lines are connected. On the VIC and 64, this line wrap table starts at location 217 (217 corresponds to the top line, 218 is the second, and so on). If the high bit (with value of 128) is on, the screen line is the beginning of a logical line. If the bit is off, the line is continued from the previous line.

Remember that screen lines are always single lines, but that logical lines might contain one or more screen lines.

Scrolling Up

You can call the computer's built-in scrolling routine with the following SYS:

```
SYS 59626     (64)
SYS 59765     (VIC)
SYS 57078     (+4/16)
```

This SYS will scroll one or two screen lines on the 64, one to four lines on the VIC, depending on the logical line at the top of the screen. If it's made up of more than one screen line, that's how many lines will scroll. If you want to limit the scroll to a single screen line, type **POKE(218), PEEK(218) OR 128** before the SYS (64 and VIC only).

The 64 and VIC scroll logical lines, but the SYS for the Plus/4 and 16 affects only a single screen line.

There is a quirk associated with the scroll routine. Clear the screen and enter this line on a 64: **PRINT"BEFORE":SYS59626: PRINT"AFTER."** After you press return, BEFORE is printed where the cursor would normally be, but AFTER shows up at the bottom of the screen. And the READY prompt is in the middle of the screen. To avoid this situation, save the position of the cursor before scrolling (see Controlling The Cursor below).

Copying One Line To Another

Part of the scroll routine moves lines up by copying them to the next higher position. Here are the POKEs and SYSes which enable the copying routine:

Commodore 64:
```
POKE781,LT:SYS59888:POKE172,PEEK(60656+LF):
POKE780,PEEK(216+LF):SYS59848
```

VIC-20:
```
POKE781,LT:SYS60030:POKE172,PEEK(60925+LF):
POKE780,PEEK(216+LF):SYS59990
```

Note that this affects screen lines (not logical lines). The variable LF (Line From) is the line you're copying from, LT (Line To) is where it will be copied to. The top of the screen is line number zero, the second line is number one, and so on.

This routine not only copies screen memory, it also takes care of color memory. Unfortunately, we do not have a Plus/4 or 16 equivalent (perhaps our readers can find it).

Clearing A Line

After the computer moves everything up, it finishes a scroll by clearing the lines at the bottom. This is how you can erase any line:

```
POKE781,LN:SYS59903     (64)
POKE781,LN:SYS60045     (VIC)
POKE205,LN:SYS57035     (+4/16)
```

Again, remember that the top line is number zero. This SYS erases screen lines on the VIC and 64, but it affects logical lines on the Plus/4 and 16.

Controlling The Cursor

It's sometimes useful to be able to read the position of the cursor or to move it to a specific row and column.

Read Cursor (64 & VIC):
```
POKE783,PEEK(783)OR1:SYS65520
R=PEEK(781):C=PEEK(782)
```

Set Cursor (64 & VIC):
```
POKE781,R:POKE782,C
POKE783,PEEK(783)AND254:SYS65520
```

In both cases, R is the row, C is the column. The top left position would be row zero, column zero. For the Plus/4 and 16, substitute the numbers 2035–2037 for 781–783.

Scrolling Down

The normal movement of the screen is up, but it's possible to make part of the screen move in the other direction. This program is for the VIC and 64 only.

```
10 PRINT"{CLR}";
20 PRINT"{HOME}{2 DOWN}";TAB(RND(1)*40);"
   Q"
30 POKE218,PEEK(218)OR128
40 PRINT"{HOME}{DOWN}{LEFT}";CHR$(148)
50 IFRND(1)>0.2THEN30
60 GOTO20
```

Line 10 clears the screen. Line 20 moves the cursor to the home position and then down two lines. A solid circle character is then printed in a random position (for the VIC, change 40 to 22).

Lines 30 and 40 make the screen scroll down. First, the second screen line is marked as the beginning of a logical line (218 is the memory location for the second screen line). Then we print {HOME}, {DOWN}, and {LEFT}, which puts the cursor at the end of the first screen line. CHR$(148) is the insert character. By inserting at the end of the first logical (and screen) line, the computer has to make space for the second line. It moves everything on the screen down a notch. The program then loops back.

A Few Suggestions For Games And Applications

These short ideas can be adapted to a variety of programs.

First, if you're working on a word processor or text editor, it helps to be able to move lines around and scroll the screen up and down.

In some programs, you may want to display a message at the top of the screen. In accounting software, for example, you might print "Accounts Receivable" on the top line. To keep it in place,

use the copy-line routine to copy the title from line zero to line one. Then SYS to the scroll routine. The words will remain on the top line. In order to prevent accidental scrolling, check the cursor position and scroll before you get to the bottom line.

The erase-line routine can be modified for a limited window effect. To clear the top half of the 64's screen, enter **FORX=0TO11:POKE781, X:SYS59903:NEXT** (if you have another computer, substitute the appropriate POKE and SYS). And the read/set cursor routine allows you to move to specific positions on the screen.

There are a lot of games that are built around scrolling. In a racing game, the racetrack scrolls toward your car. In an alien invasion game, the spaceships move down a line at a time. Other games use scrolling to move lines full of characters up and down. There are numerous applications for the techniques we've discussed here, and they can add a nice touch to your own programs.

Screen-40

Peter Fortini

Now you can have a 40-column display on any VIC with 8K or more expanded memory. Program editing becomes a breeze. And, as a bonus, graphics are easier too. "Screen-40" allows full-screen editing, is compatible with BASIC, and adds several new tools to a programmer's bag of tricks.

The screen format of the VIC-20 leaves something to be desired for the serious user. Twenty-three rows of 22 characters are not enough to display a large amount of information. BASIC programs are difficult to read and edit when statements are spread over up to four screen lines. Programs written for computers with wider screen formats must usually undergo extensive revision before they can be run on the VIC.

"Screen-40" was written to solve some of these problems by changing the screen format of the VIC to 24 rows of 40 characters. When run, Screen-40 becomes part of the operating system of the computer, supports full-screen editing, and is compatible with BASIC.

System Patches

Because the screen organization of Screen-40 differs radically from the normal screen organization of the VIC, BASIC programs using POKE commands to display graphics on the screen will not work. In addition, since Screen-40 patches into the IRQ, BREAK, NMI, INPUT, OUTPUT, and GET system vectors, it may conflict with other software which also changes these system functions.

The program consumes a total of 7K of RAM (locations 4096–11263) and will therefore run only on VICs with at least 8K of expansion RAM. The 40-column screen is created using the internal memory of the VIC to bitmap the screen. The program is 2K of machine language, plus data for upper- and lowercase character sets designed in a 7 × 4 matrix. An additional 1K is needed for operating system screen memory. With an 8K memory expander, 5K remains free for BASIC programs or other uses. With the 16K expander, 13K is available.

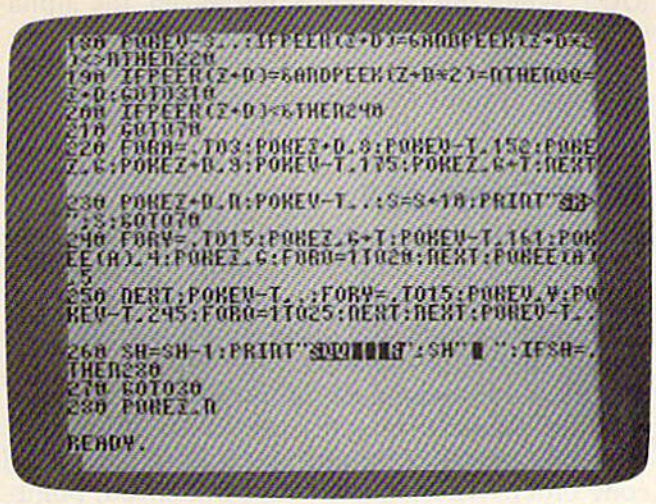
Entering The Program

Since Screen-40 is written in machine language, MLX (published frequently in COMPUTE!'s GAZETTE) is required to type it in. Because Screen-40 occupies the area of memory where BASIC programs like MLX normally reside, you must set aside the memory area for Screen-40 *before* you load MLX. Do this by typing:

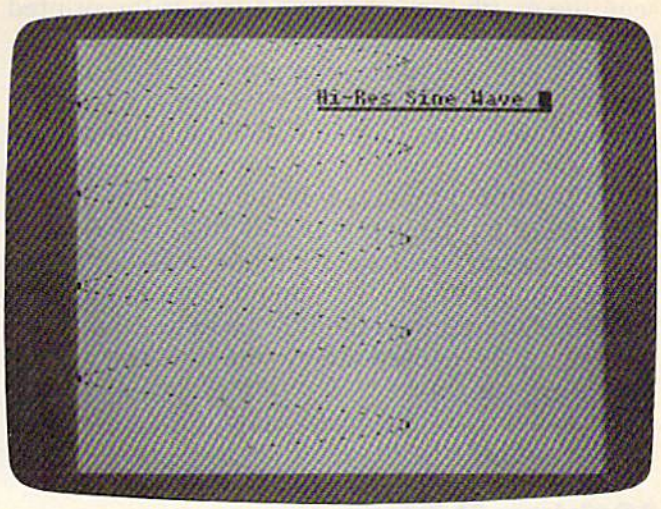
```
POKE 43,1:POKE 44,44:POKE 11264,0:NEW
```

If you choose not to enter all of Screen-40 in one sitting, you must retype this line whenever you load MLX to resume entry.

When MLX starts, it will ask you for a beginning and ending address. The respective addresses are 8192 and 10240. Once these values are entered, you can begin typing in the data from the listing with this article. Be sure you



Programming the VIC in 40 columns.



It's possible to mix characters with hi-res graphics.

have read and understood the instructions in the MLX article.

To use Screen-40, type SYS 8192 and press RETURN.

Editing Improvements

In general, working with Screen-40 is much like working with the normal screen editor of the VIC. You can move the cursor to any screen line, INSERT and DELETE spaces, make changes, and enter lines by pressing RETURN. In a few respects, most noticeably in the way the screen scrolls, Screen-40 differs from the Commodore screen editor. The changes are necessary to maintain reasonable execution speed and to add some improvements.

The cursor blinks as a solid block rather than as the reverse of the character underneath. A line of BASIC is only allowed to extend over two rows of the screen (80 characters instead of the normal 88). Insert mode, in which cursor controls typed following INSERT generate characters in reverse video, is not available. Quote mode, used to program cursor movements in BASIC programs, works normally. Up and down cursor movements wrap around rather than stopping at the top of the screen (in the case of cursor up) or forcing a scroll (cursor down). To force the screen scroll with Screen-40, move the cursor to the bottom row and press RETURN or SHIFT-RETURN.

When scrolling, the screen image jumps upward by eight lines at a time rather than by a single line. Because such scrolling is relatively infrequent and can be made to happen quickly, PRINT and LIST operations using Screen-40 are comparable in speed to the normal PRINT routine. Downward scrolling, invoked when program lines are made longer, behaves normally, but is a bit slower.

Pressing the CTRL key during printing and listing no longer slows down the scrolling. Instead, you can press either the SHIFT or the Commodore key to halt printing operations. Release the key or hold down both keys simultaneously to resume.

When printing graphics characters from the VIC graphics character sets, only the right half of each character is displayed.

Screen-40 disables character-set switching using the SHIFT and Commodore keys. To switch between uppercase/graphics and lowercase/uppercase character sets, press the CTRL and back arrow keys or PRINT CHR$(6). Characters already on the screen are not changed by this action; thus, uppercase, lowercase, and all graphics characters can be displayed simultaneously. However, moving the cursor over any character, restoring the screen image, or scrolling downward will change the character displayed to the current character set, and reverse it if reverse video is in effect.

Fancy Enhancements

Enough space was left over after repeated bouts of program optimization to add some interesting enhancements to the screen operation. If you press the Commodore and CLR/HOME keys, or if the command PRINT CHR$(15) is executed, the contents of the high-resolution display are erased without affecting operating system screen memory. Press the RESTORE key or PRINT CHR$(14) to recover the original screen image. These features are useful for programs which POKE to the high-resolution screen or the operating system screen area for graphics.

For example, you could have a program print some data, clear the display screen with PRINT CHR$(15), and draw a graph in high resolution. When the program ends and you've

seen the graph, you can look again at the printed data by pressing the RESTORE key. Another possibility is to have a program POKE graphics screen codes into the operating system screen memory, and then PRINT CHR$(14) to make them visible.

The entire screen can be scrolled downward one row using the command PRINT CHR$(16).

The color functions are more limited with Screen-40. Pressing CTRL and a color key causes all characters on the screen to change simultaneously to the chosen color. Different parts of the screen can be colored differently by POKEing color codes into color memory locations 37888 through 38127.

Making It Work

The obvious way to get a 40-column screen on the VIC is to pack two characters within the space (eight pixels square) normally used to hold one character. This is, in fact, the format of Screen-40. In order to implement the format, a high-resolution (bitmap) mode was necessary since there is a large number of possible pairs of letters or numbers.

A full-size, high-resolution screen is obtained for Screen-40 in the following way. The control registers of the 6560 video chip are set up for a format of 12 rows and 20 columns of 16 × 8 high-resolution characters. Video screen and character memory are both defined to begin at the start of the VIC's internal RAM. The first 240 bytes of this area are then filled with the numbers 16 through 255. These constitute the contents of screen memory for the video chip. Each value acts as a pointer into the character memory area, causing the video chip to display the contents of 16 bytes as a 16 × 8 block on the monitor screen. The net effect is that the entire contents of the last 3.75K of internal memory are displayed.

BASIC and the operating system also use screen memory to hold program lines for possible editing and as an input buffer. In normal operation, this area coincides with the video screen area. Screen-40 maintains a separate 1K area of memory to accommodate these functions. The operating system screen is readily relocatable by a POKE to location 648.

Subroutines within Screen-40 keep track of the cursor and manage both operating system and bitmapped screen areas. To print a character, Screen-40 enters the screen POKE value for the character into the operating system screen and then transfers the corresponding 7 × 4 pixel image from a character memory area to the high-resolution screen. Screen-40 needs only 4-bit memory blocks for characters and therefore keeps most of them in the unused part of color RAM. When the program is initialized, the alphanumeric character shapes are transferred there from packed storage in the last 384 bytes of the program. Graphics characters are drawn from the character ROM within the VIC.

Easy Graphics

Screen-40 provides a special facility for replacing all or part of the character set with other characters of your own design. The method is only a little different from the ordinary way of using programmable characters on the VIC.

Each 256-byte block of memory (in areas used for character memory by Screen-40) contains the images of 32 characters in screen POKE code order. When the screen is initialized, pointers to these pages are placed in the eight bytes immediately following the system jump vector table. This is an ordinarily unused space within the system. These pointers can be changed at any time using POKE commands. Pressing RUN/STOP–RESTORE will change the pointers back to their Screen-40 values.

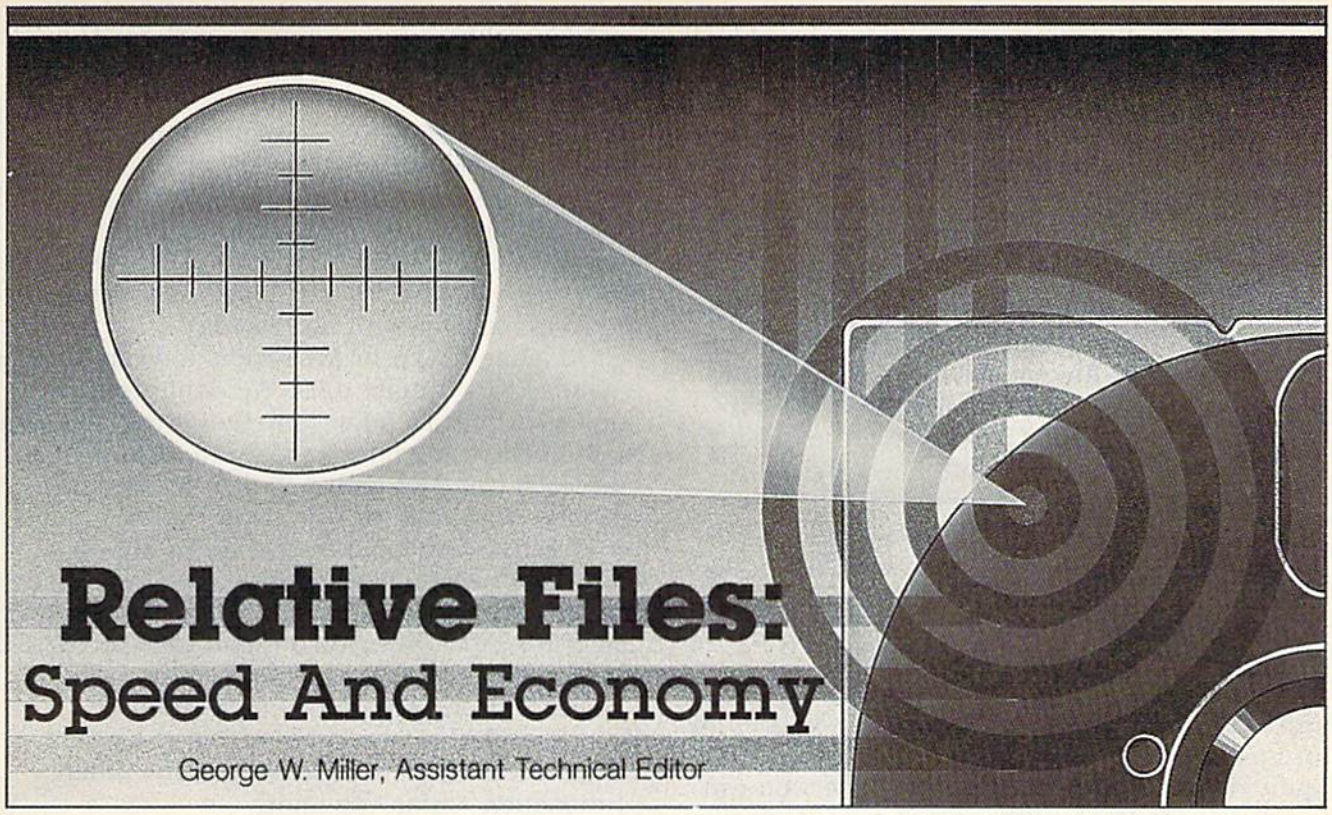
Pointer Location	Set	Characters	Screen Codes
820	Uppercase	Uppercase letters	0–31
821		Numeric symbols	32–63
822		Shift graphics	64–95
823		Commodore key graphics	96–127
824	Lowercase	Lowercase letters	0–31
825		Numeric symbols	32–63
826		Uppercase letters	64–95
827		Commodore key graphics	96–127

Suppose, for example, that you wish to redefine the Commodore key graphics characters. You define the shape of each character with a list of eight values as is usual for programmable characters. The values should range from 0 to 15 since the image will be only four bits wide. Assemble these into a protected 256-byte area of memory starting at a *page* (256-byte block of memory) boundary. Then place the page number into locations 823 and 827. (Addresses 0–255 are page 1, 256–511 are page 2, etc.)

With the screen already in high resolution, direct access to the display memory provides an alternative method for graphics. The display screen is 160 pixels wide and 192 pixels high. The following BASIC subroutine will turn on the pixel at column X, row Y, counted from the upper-left corner of the screen.

```
50 FORX=1TO100:Y=20:GOSUB100:NEXT:END
100 REM PLOT POINT AT (X,Y)
110 X=INT(X):Y=INT(Y)
120 IFX<0ORX>159ORY<0ORY>191THENRETURN
130 BYTE=4352+19*(YAND240)+2*(XAND248)+Y
140 POKE BYTE,PEEK(BYTE)OR2↑(7-(XAND7))
150 RETURN
```

See program listing on page 140.



Relative Files: Speed And Economy

George W. Miller, Assistant Technical Editor

Among disk drive owners, one of the more confusing topics is how to handle relative files. This tutorial starts from the top and walks through each step with program examples along the way. For VIC, 64, Plus/4, and 16 owners with a 1541 disk drive.

Do you have a 1541 disk drive? If so, you have over 163K of extra memory available for variables. Precisely, 167,132 bytes of additional RAM for your VIC, 64, Plus/4, or 16—and it's accessible by using relative files.

The 1541 disk drive stores information in one of several types of files, the most common of which is the program (PRG) file. When you write a BASIC program and want to save it to disk, you enter SAVE "filename",8, and the data (your program) is sent to disk. It's stored as a program file.

Sequential files aren't much more difficult to use. They, too, contain data, which is sent to the file with the PRINT# command.

Using relative files adds just a few more lines to your program. It's not that difficult. But most everyone who has tried to learn how to use them has encountered a variety of frustrations in the process. There's not much information available on how they work. Even the information on relative files in the 1541 User's Manual is incorrect and far from complete.

After several attempts to get a relative file operating correctly, many people just give up. This is understandable because a normally functioning relative file program will sometimes return a disk error, *even when there is no error.*

Let's take a step-by-step tour through the process of creating and using relative files. It's surprising how easy they really are.

Finding A Book In The Library

First, we have to understand the difference between a file, a record, a field, and a character. A file contains one or more records, which are made up of one or more fields. And the fields (as you may have guessed) are made up of characters.

Imagine that you've been hired to catalog a small library of 500 books. You buy a card file and 500 index cards. Each card has room for the author's name (up to 30 characters), book title (30 characters), year published (4 numbers), and identifying number (8 letters).

The entire collection of cards is called the *file*. Each individual card, whether it's blank or filled in, is a *record*. Each category (author, book, year, and number) is called a *field*. Note that records have to be the same size, but fields can be 4 characters long, 8, 30, or any other size. Finally, each field holds letters, numbers, or other *characters*. All told, each record (or card) will hold 72 characters, including blank spaces. This is the record length, the total number of characters used by all of the fields in the record.

Since you have 500 books and 500 cards, you'll have a problem if another book is added

to the library. So you purchase some extra blank cards, just in case you need to update the file.

And the file can hold only a certain number of cards, perhaps 1200. If the number of books ever grows to 1201, you'll have to split the file in two.

Why Use Relative Files?

Sequential files are easy to understand and handle from within a program. Most programmers use a sequential file whenever it's necessary to store information on a disk from within a program. Since sequential files seem to be easier to deal with, why bother with relative files?

Let's go back to the library for a moment. Someone has asked for a book by Faulkner. If the alphabetized card file were sequential, you would have to look at the cards in order, from beginning to end, A to Z. How much time would it take to find something by Zoroaster?

There are two very good reasons to put information in relative files: speed and economy of memory. A relative file allows faster access to individual records. With a relative file, you can go directly to the location where the information is stored and get *only* the information you're looking for. It's like a card file where you can quickly home in on the card you want.

Perhaps the more important reason for using relative files is that they do not use any of the computer's memory, except what's needed for an individual record. With the appropriate program in memory, a 3.5K VIC can manage a file containing over 163K of information. Instead of worrying about leaving enough memory to handle your data, you're free to write the elegant program you've envisioned.

A Few Rules And Regulations

Programmers commonly start counting at zero. The lowest memory location is zero, and it's found in zero page (the first page of memory). Relative files do not follow this convention. The first record is number one, and the first character in a record is called character number one.

Also, if you have two or more relative files on a disk, you can only have one open at any one time. It's possible, though, to use relative and sequential files at the same time.

Records can have a maximum size of 254 bytes. If you want larger records, you'll have to split them in two. For example, a 400-character record could be split into two 200-character records. The first half of the split records would be in the odd-numbered records (1, 3, 5) and the second half in even-numbered records (2, 4, 6).

The largest number of records you can have is 65,535, although in practice you'll never reach this limit because of the space available on the disk.

When a disk is first formatted, the directory should show 664 blocks free. Blocks, sometimes called sectors, are areas on the disk that can hold up to 256 characters of information from a program or file. Two are used by the DOS, leaving 254 bytes available in each block (the reason for the 254-character limit on records).

Relative files use side sectors to keep track of which sectors contain data. We don't need to understand at this point how they work, but note that a relative file may have up to six side sectors. Each can deal with 120 disk sectors (not records), for a total of 720, more than the number of blocks available on a disk. Filling up a disk would use six blocks for side sectors, leaving 664 − 6, or 658 for your data. Thus 658 blocks of 254 bytes each gives you a grand total of 167,132 characters in the largest possible relative file.

That means you could completely fill a blank disk with 658 records of 254 characters, or 1671 records of 100 characters, or any other combination within the limits.

Managing Them

In a relative file, each data record is numbered, and all records must be the same length. Usually, the fields within the record have a predetermined length. To find a record, all you need to know is the record number. This might be seen as a problem, but we'll look at a few tricks to simplify this process.

Unfortunately, Commodore did not include any direct commands for handling relative files in BASIC 2.0 (the version of BASIC in the VIC and 64).

But we can create and manipulate relative files using familiar file handling commands plus a couple of less familiar disk commands.

The First Step

Let's begin by creating a relative file. It takes three steps:

1. Open the file and establish the record length.
2. Mark the last record in the file.
3. Close the file.

OPEN is the command used for opening any file, including a relative file. The form of the command is only a little different from what you've probably used to send output to the printer or store data in a sequential file:

OPEN 1,8,2, *"filename*,L," + CHR$(*record length*)

This statement begins the same as any other

OPEN statement: "1" is the logical file number, followed by the device number, normally 8 for the disk drive, then the command channel number, in this case, channel 2. Any channel number will do, as long as it's between 2 and 14. *But remember which channel you've used because you'll need the number later.*

Now we add a comma and the name of the file inside quotation marks. Nothing new so far, but here comes the first change. The next item in the command is the unshifted letter ",L,". Note the commas before *and* after the letter L (for Length). This tells the DOS that a relative file is to be opened, and that the record length will be the next piece of information sent. Record length is the size of each record, not the total number of records. Finally, the length of the record is sent using a CHR$ code. Remember, the maximum length is 254.

Setting the record length is absolutely necessary when a relative file is created. When you're expanding a file (adding to the number of records), you should also send the length. When you're working with files already on the disk, you can use a simpler OPEN command:

```
OPEN 1,8,2,"filename"
```

You don't have to tell the disk drive it's a relative file, it already knows. You don't even have to give the record length. It knows that, too. And you don't have to mark it for reading or writing because you can do either.

The next step helps save a little time when using the file. Decide on the total number of records you're going to start with. You can always add more later. Since it does take time for the DOS to create the file on disk, we're going to open the file and create the records *before* we use it to store any data. It's like buying some blank index cards in the library card catalog example above. We don't want to waste time running to the store for a single blank card every time a new book is added to the library.

Positioning A Pointer

There's one more command we need to learn. It looks like this:

```
OPEN 15,8,15
PRINT#15,"P" + CHR$(cn + 96) + CHR$(lb) +
  CHR$(hb) + CHR$(pl)
```

Channel 15 is the disk command channel. We have to open it and send five characters. First, an unshifted P (think of "Position" or "Pointer"). The P tells the drive to look for a certain record. The second character is the channel number (cn) added to 96. If the relative file was opened with OPEN 1,8,2 then the channel number is 2.

The next two numbers specify a certain record, the sum of the low byte and 256 times the high byte. Record 300, for example, would translate to CHR$(44) + CHR$(1), because 300 is 44 + (1*256).

Finally, we indicate which place in the record to start reading or writing. In most cases, this will be CHR$(1), the 1 indicating we want to start at the beginning of the record, at the first character. To skip over the first five characters, send a CHR$(6).

In general, you should open channel 15 first, then open the relative file and position the pointer. Read and write as necessary, then close the relative file and the command channel. OPEN 15 is the first thing to do, CLOSE 15 the last.

A Filing Program

For demonstration purposes, we'll sketch out a simple address file program. Although the program works, it's practical usefulness is minimal. You can use the techniques provided to write a database program using relative files for any purpose you wish—just change the program lines to reflect your requirements, and, perhaps, add some error checking for faulty data input.

It's important to remember that the syntax of the statements for file handling *must* be exact. Any deviation will cause errors, some of which can be difficult to trace.

First, we decide what information to store. For an address file, we'll need the name, street address, city, state, zip code, and we'll include the phone number.

It simplifies things if the length of a field is the same for all records. Decide the maximum number of letters that will be stored in the field representing the first name, middle name, last name, and so on.

It helps to draw an outline on paper first. Here's how we'll set up the fields for the address file:

First Name	**15 characters**
Middle Name	**15 characters**
Last Name	**15 characters**
Street Address	**30 characters**
City	**25 characters**
State (abbv.)	**3 characters**
Zip Code	**5 characters**
Phone Number	**12 characters**
End of File	**1 character**
Total	**121 characters**

Now that we've determined that the total record length will be 121 characters, we're almost ready to begin. To save some program execution time, we'll decide on a file length (number of blank records) to begin with. Remember, we can add to this length at any time, without starting over, by writing to a record number

higher than the current end of file.

Now we're ready to step through the first part of our relative file program.

```
1 REM CREATE RELATIVE FILE
10 PRINT"LENGTH OF RECORD":INPUT RL:RL=RL
   +1
20 PRINT"TOTAL NUMBER OF RECORDS":INPUT R
   N:RN=RN+1
30 HB=INT(RN/256)
40 LB=RN-HB*256
50 OPEN15,8,15
60 OPEN1,8,2,"REL.FILE,L,"+CHR$(RL)
70 PRINT#15,"P"+CHR$(2+96)+CHR$(LB)+CHR$(
   HB)+CHR$(1)
80 PRINT#1,"END"
90 CLOSE1
95 INPUT#15,E,E$:PRINT"{RVS}DISK STATUS:"
   :PRINTE$:CLOSE15
```

In line 10, enter 121 for the record length (RL). This is the number of characters we decided on above, 120 plus the end-of-file marker.

In line 20, let's enter 50 for record number (RN). Of course, you can use a higher or lower number. The only limitation with a large record number is disk space (50 records of 121 characters will use a little more than 6000 bytes of disk space, or about 25 blocks). It's best to store your data on a separate disk dedicated to saving your data.

To position the file on the record, we must open the command channel and tell the DOS what we want it to do. Line 50 opens the channel, line 60 opens a relative file of length RL, and line 70 tells the DOS to position the read/write head of the disk over the proper record.

The record number is transmitted in low byte/high byte order. To make it easier and more flexible, line 30 and line 40 determine the values needed.

Next, we'll write the word END to the last record. This frees the space for the file, and writes 255 to the first byte of each record on the disk. This process can take several minutes, especially for opening a large file.

The file is now created on disk, and can be closed with line 90.

A False Error

We could tie things up here by closing the command channel (CLOSE 15), but if we did, the red light on the disk drive would flash to signal an error. But there really is no error. What happens in this situation is that we wrote to a record number higher than the one on the disk, so DOS sends a RECORD NOT PRESENT error message.

Line 95 reads the error channel and prints out the false error message. Don't be alarmed. All it means is that there was no such record before.

We now have a relative file on disk ready to receive data, and we can begin putting data together for storage.

Preparing The Record

The name Sue contains only three characters, but Annette contains seven characters. It would be convenient if Sue's middle name began at the same point in the record that Annette's middle name begins. To achieve this, we can concatenate the name, filling in the blanks with spaces. (Do not type NEW before typing this in, it is meant to be added to the previous program lines.)

```
99 REM PREPARE TO WRITE FILE
100 RC=RC+1
110 RC$=""
120 SP$="{30 SPACES}"
130 PRINT"FIRST NAME":INPUTNF$
140 PRINT"MIDDLE NAME":INPUTMN$
150 PRINT"LAST NAME":INPUTLN$
160 PRINT"STREET ADDRESS":INPUTSA$
170 PRINT"CITY":INPUTCI$
180 PRINT"STATE":INPUTST$
190 PRINT"ZIP CODE":INPUTZI$
200 PRINT"PHONE NUMBER":INPUTPH$
210 RC$=RC$+LEFT$(NF$+SP$,15)
220 RC$=RC$+LEFT$(MN$+SP$,15)
230 RC$=RC$+LEFT$(LN$+SP$,15)
240 RC$=RC$+LEFT$(SA$+SP$,30)
250 RC$=RC$+LEFT$(CI$+SP$,25)
260 RC$=RC$+LEFT$(ST$+SP$,3)
270 RC$=RC$+LEFT$(ZI$+SP$,5)
280 RC$=RC$+LEFT$(PH$+SP$,12)
```

Lines 210–280 achieve this result, so the string RC$ contains all the data with the correct number of characters in each field.

Each square represents one byte of information. Thick black lines show the beginning and end of each field. Fields are completely full when the file is written—the blank bytes are filled with spaces, as in lines 210–280 of the example program.

FIELD	EXTENT OF FIELD & TYPICAL INFORMATION													
FIRST NAME	S	U	E											
MIDDLE NAME	A	N	N											
LAST NAME	S	M	I	T	H									
STREET ADDRESS	1	2	3		M	A	I	N		S	T			
CITY	A	N	Y	T	O	W	N					STATE		ZIP
					PHONE							O	K	1	2
ZIP CODE (cont'd)	3	4	5	1	2	3	-	4	5	6	-	7	8	9	0

Writing To Disk

To write the data to disk, follow the same outline as in creating the file:

1. Open the file.
2. Position the file on the record to be written.
3. Write the record.
4. Close the file (optional).

The Controversy Over Relative Files

Misconceptions And Misinformation

Todd Heimarck, Assistant Editor

The literature about relative files is fraught with confusion. The disk drive manual and various reference books contain misinformation and misconceptions about what relative files are and how they work. Let's examine some of the myths.

Are There Numerous Bugs?

There is only one bug that afflicts relative files (see below). It is rare and can be avoided quite easily. Also, relative files sometimes cause a false disk error, for a good reason.

When working with relative files, remember the limits: a maximum of 254 characters per record, a maximum of 65535 records per file, and 163K characters (658 disk sectors of 254 bytes each) per disk.

Only 720 Records Per File?

This is probably the most common, most repeated misconception. It appears in many books, and the disk drive manual itself hints that you can't have more than 720 records.

Relative files are fast because of side sectors. When you ask to read record number 533, the disk operating system (DOS) uses side sectors to figure out where record 533 is located. It then jumps right to that disk sector and collects the information.

Each of the six side sectors can manage up to 120 disk sectors, for a total of 720, more than enough to cover the maximum 658 sectors available for relative files on a blank disk. Some writers have interpreted this to mean you can have a maximum of 720 records. It's just not true—720 is the maximum number of sectors *(not records) which can be referenced by six side sectors.* And you'll never reach this limit because a disk has only 664 blocks, six of which may be reserved for side sectors.

The maximum number of records is 65535 (although the records would have to be two bytes each, at most, to fit into the limit of 163K bytes per disk).

Ignore All Disk Errors

Wrong again. With one exception, you can ignore any advice which says to ignore disk errors caused by relative files. Three errors are commonly associated with reading and writing relative files:

```
50 RECORD NOT PRESENT
51 OVERFLOW IN RECORD
52 FILE TOO LARGE
```

Error 50 means you tried to access (read or write) a record number higher than the highest record currently on disk. If you're creating a new file, or expanding a file, you can ignore this error (because you actually did access a record that didn't exist). In fact, an error 50 confirms that the creation or expansion of the file was successful. You can stop the blinking of the red error light by reading the error channel (INPUT#15,E,E$). E should be 50, E$ should be RECORD NOT PRESENT.

Error 51 means you tried to send more characters than the file was set up to receive—for example, writing 122 characters to a record that was created to hold 121. See the discussion of carriage returns below for more information.

Error 52 results from attempting to create files that are too big to fit in the remaining space on the disk. If you have other programs or files on the disk, the room for relative files is diminished, one reason to devote a whole disk to a relative file if you expect to store a lot of data.

When storing data in sequential or relative files, it's a good idea to regularly read the error channel. When creating a new file, check for error 50. In other cases, a disk error indicates a problem with the file. But don't ignore disk errors.

Creating A New File

In general, you should create a blank file before you start using it. If you plan to have 60 records, some reference books will recommend writing something to all 60 records. It's not really necessary—all you have to do is write to record 60; the other 59 will be created automatically. Each of the blank records will contain a CHR$(255) followed by a series of CHR$(0)s.

When a relative file is created, you must send the length, with **",L,"+CHR$(record length)**. After that, the record length is optional (unless you're expanding the number of records in the file, in which case you should send the length). It doesn't hurt to add the length, but it's unnecessary.

Always Leave Room For A Carriage Return

This one's right. If you want 15 characters per record, set it up with a length of 16. This is important, because PRINT#, like PRINT, adds a carriage return to the end of each string it sends.

What if you don't add one to the length of the record? Sending 15 characters plus a CHR$(13) makes a total of 16 characters. If you print 16 characters to a record set up for 15, the result is an error 51, OVERFLOW IN RECORD. The disk error light will blink every time you write to a record.

The Pros And Cons Of Field Separators

There are two ways of storing and recalling data from a relative file. The first method is to concatenate the fields and send a long string to the record: **RC$=A$+B$+C$+D$: PRINT#1,RC$**. To read it back into memory, use GET# to read a character at a time. Then the MID$ function breaks the record into the different fields.

The other way is to separate the fields with a carriage return or a comma: **RC$=A$+CHR$(13)+B$+CHR$(13)+C$+CHR$(13)+D$:PRINT#1,RC$**. Now, instead of GET# inside a FOR-NEXT loop, you can set the pointer and then **INPUT#1, A$,B$,C$,D$**. The advantage is that INPUT# is a little faster than GET#. You can also create fields of variable length; you don't have to pad out the fields with extra spaces. The disadvantage is that you can't use any commas or carriage returns within a field. And the record length may have to be a little larger to make room for the separators.

A Bug In Relative Files

The INPUT# command will sometimes fail to read all of the characters in a relative file when you are updating records sequentially. You can eliminate the bug with the simple precaution of positioning the record pointer before and after printing to a record:

```
540 PRINT#15, "P"+CHR$(2+96)+CHR$(103)
    +CHR$(2)+CHR$(1)
550 PRINT#1,"NEW INFORMATION"
560 PRINT#15, "P"+CHR$(2+96)+CHR$
    (103)+CHR$(2)+CHR$(1)
```

As long as the pointer is set before and after printing, you'll never encounter the bug.

The bug is related to *spanning and spill*. Each disk sector holds 256 bytes, numbered 0–255. The first two bytes are used by DOS, leaving 254 for programs and files. A relative file containing 200 characters per record fits into the disk sectors like this:

Sector	Bytes	Record Number
1	0–1	used by DOS
1	2–201	record 1
1	202–255	record 2 (first part)
2	0–1	used by DOS
2	2–147	record 2 (spill)
2	148–255	record 3 (first part)
3	0–1	used by DOS
3	2–95	record 3 (spill)

Record 1 starts at a sector boundary, the beginning of sector 1, and fits entirely into

that sector, while records 2 and 3 are split between sectors (they *span* two sectors). The part that overlaps into the second sector is called the *spill*, because it spills over into the next block.

The bug happens when three conditions are true: 1) You're updating a file sequentially, using a FOR-NEXT loop to read individual records in a file, changing something, and writing the record back to disk. 2) You write only a few characters to a record that begins on a sector boundary (that is, you write fewer than 199 characters to record 1 in the example above). 3) The number of characters put into the boundary record (1) is less than the spill of the record that spans the second and third sectors after the boundary record (record 3).

The problem won't happen again until you have a record beginning on an even boundary.

It sounds complicated, so let's force the bug to happen. First, create a relative file with six records of 252 characters each:

```
10 OPEN15,8,15:OPEN1,8,2,"0:ABC,L,"+CHR$(
   252)
20 PRINT#15,"P"+CHR$(2+96)+CHR$(6)+CHR$(0
   )+CHR$(1)
30 PRINT#1,"LAST RECORD"
40 INPUT#15,E,E$:PRINTE$:CLOSE1:CLOSE15
```

Line 10 opens the command channel and a relative file of length 252. Line 20 positions the pointer to record 6. Line 30 prints "LAST RECORD" to record 6 (creating five blank records) and line 40 closes the files. Next, we'll put something into each record (type NEW before entering this program):

```
10 A$="123456789"
20 OPEN15,8,15:OPEN1,8,2,"0:ABC"
30 FORJ=1TO5:GOSUB500
40 PRINT#1,A$:NEXT
50 REM NOW CHANGE DATA
60 J=1:GOSUB500:PRINT#1,"A"
70 FORJ=2TO5:GOSUB500
80 INPUT#1,B$:PRINT"RECORD #";J,B$
90 B$=B$+STR$(J)
100 PRINT"CHANGED TO ";B$
110 GOSUB500:PRINT#1,B$
120 NEXT
130 FORJ=1TO5:GOSUB500:INPUT#1,C$:PRINTJ,
    C$:NEXT
140 CLOSE1:CLOSE15
499 END
500 PRINT#15,"P"+CHR$(2+96)+CHR$(J)+CHR$(
    0)+CHR$(1):RETURN
```

The subroutine at 500 positions the pointer to record J. First, lines 10–40 print A$ ("123456789") to the first five records. Line 60 changes record 1 (which begins on a sector boundary) to contain a single character "A" (try AB or ABC and see what happens). In lines 70–120, we update records 2–5, inputting B$ and then adding the record number to B$. Line 80 reads the record with INPUT#, prints it to the screen, and adds the string equivalent of number J (STR$(J)).

Finally, lines 130–140 read through the file and print the contents of each record to the screen. Pay close attention to record 3, which has been corrupted.

Now, add this line:

```
115 GOSUB500
```

Subroutine 500 positions the record pointer. Run the program again, and the bug disappears.

Open the command channel, open the relative file, position the pointer on the disk, then write the record. But this time we'll write real data (again, add these lines to the lines previously typed).

```
299 REM WRITE TO FILE
300 OPEN15,8,15
310 OPEN1,8,2,"REL.FILE,L"
320 HB=INT(RC/256)
330 LB=RC-HB*256
340 PRINT#15,"P"+CHR$(2+96)+CHR$(LB)+CHR$
    (HB)+CHR$(1)
350 PRINT#1,RC$
360 CLOSE1
370 INPUT#15,E,E$:PRINT"{RVS}DISK STATUS:
    ":PRINTE$:CLOSE15
380 PRINT:PRINT"ANOTHER ENTRY?"
390 GETG$:IFG$=""THEN390
400 IFG$="N"THEN500
410 IFG$="Y"THEN100
420 GOTO390
```

Line 350 writes the information to the disk, line 370 reads the error channel (if no errors occurred, it should say OK), and line 380 prompts us for another entry.

You may have noticed that we didn't send the end-of-file marker we had planned for. 120 characters were sent to a record that can hold 121. Actually, we did send 121. PRINT# (just like PRINT) always adds a carriage return (CHR$(13)) if the string is not followed by a comma or semicolon. There's a 13 at position

121, the end of the record.

It's a good idea to fill the entire record with information, even if the empty fields are only defined as spaces. If you don't, the record will be padded out with CHR$(0)s.

Reading The File

After the file is written, you are asked if you want another entry. Answering no (press the N key) takes us to the next section: reading the files.

1. Open the file.
2. Position the file on the record to be read.
3. Read the record.
4. Close the file (optional).

Once the data is stored on the disk, reading is fairly simple. If the record contains less than 80 characters, the INPUT# command can be used and the record read into memory, but since we chose a record length of 120 characters, we'll have to use GET# and concatenate to build RC$, as in line 560 below.

Lines 500–660 will read the records from the disk in sequence from the lowest to the highest number. The steps should look familiar by now: Open channel 15, open the relative file (as before, Length is optional), position the pointer, and pluck characters from disk into memory using GET#.

```
499 REM READ RELATIVE FILE IN ORDER
500 FORA=1TORC:RC$="":PRINT"RECORD #";A
510 OPEN15,8,15
520 OPEN1,8,2,"REL.FILE"
530 HB=INT(A/256)
540 LB=A-HB*256
550 PRINT#15,"P"+CHR$(2+96)+CHR$(LB)+CHR$
    (HB)+CHR$(1)
560 FORB=1TO120:GET#1,A$:RC$=RC$+A$:NEXT
570 CLOSE1:CLOSE15
580 PRINTMID$(RC$,1,15)
590 PRINTMID$(RC$,16,15)
600 PRINTMID$(RC$,31,15)
610 PRINTMID$(RC$,46,30)
620 PRINTMID$(RC$,76,25)
630 PRINTMID$(RC$,101,3)
640 PRINTMID$(RC$,104,5)
650 PRINTMID$(RC$,109,12)
660 NEXT
```

When you'd like to read the data from an individual record, it's possible to go directly to that record and read the data:

```
699 REM READ INDIVIDUAL RECORD
700 PRINT"RECORD # TO READ":INPUTRE
710 PRINT"STARTING AT POSITION":INPUTPO
720 HB=INT(RE/256):LB=RE-HB*256
730 OPEN15,8,15
740 OPEN1,8,2,"REL.FILE"
750 PRINT#15,"P"+CHR$(2+96)+CHR$(LB)+CHR$
    (HB)+CHR$(PO)
760 FORA=POTO120:GET#1,A$:PRINTA$;:NEXT
770 INPUT#15,E,E$:PRINT"{RVS}DISK STATUS:
    ":PRINTE$
780 CLOSE1:CLOSE15
790 PRINT"PRESS ANY KEY TO CONTINUE"
800 GETG$:IFG$=""THEN800
810 GOTO700
```

Specify which record you want to see by record number, and the DOS takes care of finding it. It also asks for position. To skip over first names, enter a 16. To see phone numbers only, use 109.

Changing A Record

Changing the data in a relative file is straightforward enough. Start out by opening the command channel and the file, positioning the file over the record, then reading the entire record into memory.

Now make any necessary changes to the data and concatenate to fill out all the fields within the record. Next, reposition the file by using:

PRINT#15,"P"+CHR$(2)+CHR$(*lb*)+CHR$(*hb*)
+CHR$ (*first byte*)

Now use PRINT# to rewrite the record. Finally, *position the pointer to the first character in the record again.* It would seem that this is unnecessary, since we positioned the record prior to writing the data, but unless this step is included, our data may be corrupted. For details about why this must be done, see the accompanying article, "The Controversy Over Relative Files."

The Last Step

A huge amount of data can be stored on disk in relative files, but the data is of no value, of course, unless we can use it.

We could read each record into memory every time we need to reference the information, but with the slow speed of the 1541 disk drive, that could develop into a very slow process, especially as our file becomes longer. This would eliminate the speed advantage of using a relative file.

The easiest way to handle a search through a relative file is to create *index files* for the key fields you'd like to search for information.

These index files are usually sequential files which have already been alphabetized or put into order (using a sort utility) and loaded into an array reserved by a DIM statement. It's not necessary to read the index file into memory until you need it, and the same variables can be used for the values held in several index files for different fields.

Relative files are not only fast and memory-efficient, they can be very flexible. The data is easy to get at and can be rearranged and sorted to fit your file-handling needs, especially if you use sequential index files. With a little practice, you'll become comfortable with them.

Tape Program Rescue

John R. Hampton

This short machine language utility reads a program from tape into memory, allowing you to recover programs that have become unloadable. For the VIC or 64.

The Commodore Datassette is an inexpensive and generally reliable device on which to store programs and data.

But sooner or later, you'll be unfortunate enough to combine a very long program with a bad tape. After saving the program, you won't be able to load it back into the computer. This is one reason to keep backup copies of all important programs.

What do you do if you don't have a backup, and don't feel up to retyping the entire program? "Tape Program Rescue" may be the answer.

Fixing A Bad SAVE

A program on tape can be scrambled or destroyed by a number of things: magnetism, a faulty coating on the tape, or ripped or creased tape. You may not be able to rescue the entire program, but you should be able to recover at least a portion, saving a lot of retyping time.

Tape Program Rescue is written in machine language, but uses BASIC to POKE the program into memory. When you run it, the problem program is loaded from tape into memory, overwriting the BASIC part of Tape Program Rescue. For this reason, you should save Tape Program Rescue before you attempt to use it, or else your typing will be lost.

To use it, load (but don't run) Tape Program Rescue. Then put the problem tape in the cassette drive and fast forward the tape to a spot just before the beginning of the program to be rescued.

Now type RUN. The short ML program rescue routine is POKEd into memory and you should see the CUT PROGRAM OFF AT LINE NUMBER? prompt. Input a line number from the program. Tape program rescue will read up to, *but not including*, that line. The remaining lines will not load into memory. (You can also use this utility to delete the last portion of a program on a good tape.)

You may have to experiment a bit. If you can't load up to line 1100, try cutting off the program at 1000 or 740 or some smaller number. If it works, part of the previously unloadable program will have been loaded into memory and you can save that part to a good tape. You may still have to retype the last part of the program.

Setting Up Memory

Tape Program Rescue loads programs into the same section of memory they were saved from. This means you can't use a 64 to rescue VIC programs, nor can you use a VIC to recover 64 programs. The memory configuration when you rescue must be the same as when you saved. VIC owners should insert or remove memory expansion according to how much was needed for the problem program.

Also, the line number used for cutting off the program must be a real line number. If a program has lines 400 and 410 and you try to cut it off at 405, Tape Program Rescue will not operate properly.

See program listing on page 132.

Charles Brannon
Program Editor

There's a special class of computer peripherals that intrigue and fascinate us all. Printers, disk drives, memory expansion, and monitors are all important parts of a complete computer system, but they're mundane compared to things like voice synthesizers, music keyboards, light pens, and touch tablets. It can be hard to justify the purchase of these computer "goodies" until you begin to use them. They amplify your creativity, a quality hard to distill into dollars and sense.

If a touch tablet doesn't turn you into a computer age Michelangelo, you might want to cheat. Instead of laboriously tracing a drawing pixel-by-pixel, why not just take a snapshot? Point a camera at your subject, and you've got computer graphics.

Video Acquisition

Camera digitization, otherwise known as video acquisition, has been around quite a while (maybe you've seen the digitized picture of computer chips), but its cost has been out of most people's reach, until now. You can now set up your own digitizing studio for $349.95 (including black and white video camera) with COMPUTEREYES from Digital Vision.

COMPUTEREYES is one of those magical black boxes that plugs into the back of your computer (specifically, the user port). You plug any standard (noninterlaced NTSC) video source (video camera, videocassette recorder, laser disc, composite computer signal) into the side of the box. This signal is the same level as Commodore 64 composite video, the same signal used by most color and monochrome monitors. With a video camera, you can digitize almost anything you can focus on. You can plug the video camera into your monitor while you set up the shot, then into COMPUTEREYES when you're ready to digitize. Or if you don't want to shell out $229 for a black and white video camera, you can digitize pictures off your television set (courtesy of the tuner in your VCR). Imagine using a few frames of *Star Trek* in your next videogame.

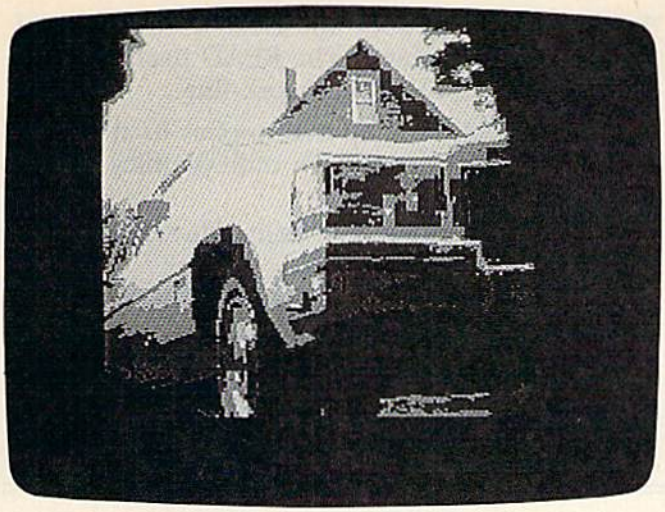
It's really quite easy to use COMPUTEREYES. The standard digitizing program lets you adjust the sync by turning a small knob on the COMPUTEREYES module. You turn the knob until the message IN SYNC appears. This customizes the box with whatever video source you're using. Setting the brightness control is just as easy, but a little frustrating. The program scans slowly across the screen, one vertical line at a time. It takes about six seconds to sweep across the screen.

In the brightness mode, you just get two scales—on and off, or black and white. The screen is very distorted, since the time taken by the 64's VIC chip interrupts the digitizing timing. You try to adjust the brightness control so that only the brightest parts of the subject are lit on the screen. It can take a lot of trial and error to find the right brightness level.

Scanalyze

After you've adjusted the brightness, you're ready to take your first picture. The digitizing program permits three options: Normal Scan, 4-Level Scan, and 8-Level Scan. Normal Scan is similar to the Brightness adjustment, but the screen is blanked for the sake of timing. After six seconds, your picture appears. Normal Scan only makes black and white distinctions; the pictures are extremely high in contrast. The 4-Level Scan performs four scans, each time lowering its threshold for what counts as "white." It merges these scans to get a shaded picture. These aren't true gray scales, but varying dot densities, similar to newspaper photographs. Since four scans are taken, it takes about 25 seconds to take a 4-Level Scan. The 8-Level Scan works similarly, but takes eight scans, each time at a lower brightness threshold.

Don't expect photographic quality. The weak link is not COMPUTEREYES, but the Commodore 64's 320 × 200 pixel high-resolution screen. The pictures are extremely coarse and grainy. However, if you stand a few feet away from the screen, the pixels become smaller, and



A four-level scan of a car in a driveway (courtesy of Digital Vision).

your eye tends to fill in the gaps. You can also print the pictures, then reduce them with a photocopy machine. Reducing a picture makes all the pixels smaller and closer together, giving you more effective resolution. Nonetheless, the pictures do have an artistic quality to them that photographs miss in being too true to life. It's as if they were painted with a broad paintbrush in only five shades.

You can buy additional software disks ($15 each) that permit you to store your pictures in formats compatible with several popular graphics programs: *KoalaPainter, Doodle, Flexidraw,* and *Print Shop*. These packages let you take advantage of the 64's five gray scales (black, dark gray, medium gray, light gray, and white). Although the horizontal resolution is halved, (since multicolor mode must be used) these true gray scales make for more realistic pictures.

A Facial Bias

I found that the best subject is someone's face. The brain is biased towards facial features, which is why it's so easy to imagine the man in the moon. More importantly, the face reflects light subtly, according to facial contours. Even with poor resolution, the various shadows and contours translate well to just five gray scales, producing pictures with depth. Besides, what do people take pictures of anyway? Other people. I've tried to take pictures of landscapes, but the computer's eye is too crude to produce easily recognizable pictures. It works well on closeups, though.

The time required to take a picture can be really frustrating. Just try holding perfectly still for 50 seconds. It's not easy. We're in the early days of computer photography (ask your great-grandmother to tell you about posing for ten seconds for a nineteenth century daguerreotype).

How It Works

COMPUTEREYES is a *slow scan* video acquisition system. It relies on a crucial interaction between the hardware and software. The box doesn't do all the work. You can't just grab complete pictures from the box. For one thing, a picture is displayed as quickly as 1/30 second, too fast for even a machine language program to process 64,000 pixels. Instead, the box sends one vertical column of scanning at a time to permit the software to analyze that column at a more leisurely rate. The scans are taken once per video frame, so it takes about six seconds (5.33 seconds, actually) to make one full sweep. The software is capable of setting the box's brightness threshold for each scan in order to produce gray scales.

What practical use is there for a camera digitizer? You could ask the same question about any camera. Pictures justify themselves. It's just plain fun. There's something fascinating about putting pictures on computers. You've seen the booths at carnivals and shopping malls that take your picture and print it on a T-shirt. They use very similar equipment.

But the fun doesn't stop after you've taken the picture. Load it into your drawing program, and you can alter or modify it as you will. Take your picture and add a mustache and a beard. Erase the hair to see what you'd look like bald. Color it in. Take several pictures and swap body parts around (put Lucy's eyes on Ricky). Photoreduce the picture and use it as a unique snapshot to give to acquaintances.

For business, camera digitization is a great shortcut to presentation graphics. Again, load the picture into a drawing program to touch it up, then add text and merge in graphs.

Programmers can use these pictures in their programs, using them as game backgrounds. Grab smaller elements and turn them into sprites. You can write programs to enhance and smooth out the rough edges in the pictures. If you're really clever, maybe you can write programs to let the computer *really* see, giving it limited visual recognition. For example, a security system could take two scans of a hallway. If both scans are not identical, someone or something is moving around in there.

COMPUTEREYES module with system software, $129.95
COMPUTEREYES module with black and white video camera, $349.95
COMPUTEREYES black and white video camera, $229.95
Graphics Compatible Software:
KoalaPainter, Doodle, Print Shop, Flexidraw
$15 each (less if ordering more than one)

Digital Vision, Inc.
14 Oak Street, Suite 2
Needham, MA 02192

1541 Flash! Update

In my review of *1541 Flash!* for the Commodore 64/1541, I stated that I had problems loading some Epyx games, even with the *Flash!* speedup disabled. Bryce Nesbitt, author of *1541 Flash!*, told me that early on he made a change to allow the Epyx games to load with *1541 Flash!* turned off. In addition, he noted that these steps should be followed to load an Epyx game in the *Flash!* mode:

1. Boot up as normal (LOAD "*",8,1 or SHIFT-RUN/STOP).
2. Wait about five seconds.
3. Open the drive door and close it. Repeat until the software "catches." The READ head will move and everything will work fine.

He also sent along a tip that applies to all 1541 disk drives. You can scratch multiple files with the syntax:

```
OPEN 15,8,15:PRINT #15,"S0:file1,file2,file3,etc.":
CLOSE 15
```

This is the same as the normal scratch command, except commas can be used to permit multiple scratches. Be careful with this one. There are quite a few hidden secrets within the 1541 disk drive.

Bug-Swatter:
Modifications And Corrections

• "Disk Handler" (March) does not work correctly because the variable K does not allow updating the next track and sector to be read. Reader Charles M. Shapin has found a solution to this bug: Change K to G in lines 436, 444, and 446.

• Line 37368 in the MLX listing of "MetaBASIC" (April) caused problems for some readers, who saw the second to the last number as a 175. That number is a 176. The corner was accidentally cut off.

Also, reader Harry G. Morgan reports that the LLIST command may not work correctly on some printers. To fix it, load MetaBASIC, type NEW, and SYS36864 to enable MetaBASIC. Enter MEMORY40336–40341. You should see that every other number on the first line is a 4. This is the beginning of a machine language routine equivalent to OPEN 4,4,4. Some Commodore printers require that the last number be either a 0 (OPEN 4,4,0 for uppercase/graphics) or a 7 (OPEN 4,4,7 for upper/lowercase). You can also change the second number if you own a Commodore 1520 Printer/Plotter, which is device number 6 (change the three 4's to 4, 6, and 0, respectively).

To make the change, put the commercial-at sign (@) in front of the line, cursor over to the last four on the line, change it, and press RETURN. Then use the BSAVE command to save the new copy of MetaBASIC.

Also, the DEFAULT function should not be called before using TERMINAL. You can disable DEFAULT by typing MONITOR.

• "1526 Hi-Res Screen Dump" (April) works as published. However, the program was renumbered during testing, and the number 100 in line 130 should have been changed to a 130. Thus, readers who typed the DATA statements incorrectly will see a message that a specific line is wrong. But the line that is reported to be wrong is actually 30 lower than the line containing the mistake. If you made no typing mistakes, this error won't affect the program.

• Although there are no errors in "Disk/Tape Backup" (December 1984), reader Gerald Hass has discovered that the DOS Wedge program should be disabled before running the program. The wedge can interfere with the backup process. And the article did not clearly state that while program and sequential files are backed up, relative files are not.

As mentioned in the article, the program reads files from disk and "packs" the data in a special format for saving to tape. When the file is restored, the information is unpacked. This means Disk/Tape Backup cannot be used for copying an original tape file to disk. For a tape-to-disk copy program, see this month's "GAZETTE Feedback."

• The printer used to list the 64 version of "Pool" (April) put an unnecessary question mark in line 49830. This does not affect the program, since MLX will not allow entry of question marks.

• A semicolon (;) was omitted from the end of line 350 in the 64 version of "Number Quest" (April). The program will run without the semicolon, but the Automatic Proofreader checksum will be incorrect.

DELUXE RS232 INTERFACE

This is unconditionally the best RS232 Interface available for the Commodore 64. **Satisfaction guaranteed or your money back.** A full set of RS232 signals (pins 2-8, 12, 20, 22). Four switch selections allow using any standard RS232 printer or modem. Comes complete with 3ft cable with either male or female DB25 connector. Very complete documentation, type-in BASIC terminal program, and programming examples.

Specify Male (#10-112) or Female (#10-113) DB25. **$44.95**

PRINTMASTER/E
ECONOMY PRINTER INTERFACE

This four foot cable plugs into the USER I/O port and then connects to your parallel printer. The disk supplied with the cable contains different machine language wedgeges. You load one in and it changes the USER I/O port to be device #4parallel printer port. Wedges load several different places. Works with all basic programs and most machine language ones. **Does graphics characters and adds several BASIC commands. Easy to use. Works great with EASYSCRIPT.** #10-108 **$34.95**

PRINTMASTER/+G
With IntelliFeatures
Deluxe Parallel Printer Interface

This is one of, if not **THE BEST PARALLEL PRINTER INTERFACE AVAILABLE** for the Commodore 64 computer. All necessary switch selections. Emulation, transparent, and listing modes. Does all graphics and graphics characters on all popular dot matrix printers. Does enhanced graphics characters and double density graphics on Epson compatible printers. Dip switch selection sets single or double density graphics. Double density graphics printouts look much better. Print head shuffle minimized, not like some rattle box interfaces (you know who we mean). Set top, bottom, left, right margins, page length. Single page feed. Unit is cassette port or externally powered. Reset button. **IntelliFeatures are fantastic!** LOAD"S", 4, 1 loads and displays printer interface status on screen. LOAD"$", 4, 1 loads and displays disk directory on screen without destroying BASIC program. Other great features. Diskette supled with hi-res dump and other programs. Optional 16K printer buffer. **$119.95**

Don't settle for second best! Get a Printmaster/+G. $10-115

Optional user installable 16K printer buffer mounts inside case, and has an additional ROM for more IntelliFeatures. Design your own character set. LOAD"UNNEW", 4, 1. LOAD"RENUM", 4, 1. Much more. Buffer takes 16K in 40 seconds. #110-116 **$89.95**

PRINTMASTER/S
With IntelliFeatures
Serial Bus RS232 Printer Interface

Can't make your Multiplan work with your RS232 printer? This Printer Interface connects to the serial bus, and supplies full RS232 signals to run virtually any RS232 printer as device #4. Works with all software. It has all of the features of the Printmaster/+G (except 16K buffer), but it is for an RS232 printer. Comes with a 3 foot cable. Specify Male (#10-117) or Female (#10-118) DB25. Allows full DTR or Xon-Xoff handshaking. **Trouble free use. Money back guarantee. $139.95**

Omnitronix

PO BOX 43 DEPT.G6
MERCER IS. WA 98040

TO ORDER: CALL 206/236-2983
or write or see your local dealer. Add $2.25 each for shipping. 30 day money back guarantee if not completely satisfied (less shipping).

Dealers call call call!!

VISA MasterCard

ATI TAKES THE FRUSTRATIONS OUT OF USING YOUR COMPUTER BY PROVIDING YOU WITH QUALITY SOFTWARE AT AN AFFORDABLE PRICE.

"BITS AND PIECES" ™ — Disk Utilities $29.95

• Sector Copy a Disk • Back-Up Copy "Whole Bit" Disk Series • Program or sequential file copy to disk & conversion of program files to sequential files • Check track and sector for errors • Examine contents of a file, block by block in HEX or ASCII • Modify contents of a block • Check whole disk for errors • Save Disk Utilities onto disk • SCREEN-DUMP Hi-Res Graphics and Characters to printer using any selected memory locations • MULTI-COLOR SPRITE MAKER • Quick program (Machine language or Basic) transfer to another disk • Provided on diskette in a plastic library case with instruction manual (for Commodore 64™; 1541 & MSD single & dual drive)

"THE WHOLE BIT" ™ — Word Processing $39.95

• MENU-DRIVEN • 80 column view screen • On-line HELP Screens • Enhanced cursor movement • Supports major printers by Menu Selection • Ability to custom tailor print commands • Tab-setting 240 columns to screen • File copies printed in any sequence • Sequential page numbering from one file to another • Screen and character color selectable • Menu selection of disk files • Global search and/or replace • Block move/copy • File merge • Horizontal/vertical scrolling • Left, right, block justification • Sub/superscript • Block erase • Header/footer/page numbering • indentation • Search/replace defined phrases • Text Centering • and more . . . • Provided on diskette with User's Manual in a 3 ring binder (for Commodore 64)

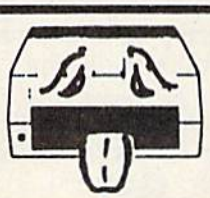
"FILE CONVERTER" ™ C-64 $39.95/PET $44.95

• FILE CONVERTER: Allows the transfer of files between the popular data base programs; Manager™, Flexfile™, Superbase 64™, Practifile™, Silicon Office™, and others. Program, sequential, or relative files may be converted to a differing type including PET to ASCII or Screenpoke, and vice-versa. Will convert fixed or variable files. Files from any data base may be merged into "THE WHOLE BIT" ™ word-processing. • Allows the transfer of text files from one word processing program to another; undefined control codes can be ignored or deleted • FAST DATA BASE ENTRY; Creates a sequential data base file of up to 32 fields per record; a very fast data base entry program useful for entering large mailing lists, etc.; can be easily converted to your specific data base using "FILE CONVERTER" • READ RELATIVE; Allows viewing or printing of any selected relative file record (PET, ASCII or Screenpoke form) • Provided on diskette in a plastic library case with instruction manual (for Commodore 64 and PET series computers)

Prices Quoted in U.S. Funds
MASTERCARD/VISA
FREE SHIPPING
(207) 439-5074

Applied Technologies, Inc.
Computer Products Div.
Lyndon Way
Kittery, Maine 03904

Dealer & Distributor Inquires Invited



HAVE YOU GOT THE 1541 BLUES?

WE'VE GOT THE PERMANENT FIX!!
Here's what we do . . .

FIRST, we disassemble your 1541 disk drive.
SECOND, we re-machine the stepper motor to the shaft.
THIRD, we adjust the stepper motor and align the heads.
FOURTH, we upgrade your DOS to the latest version available.

GUARANTEED FOR SIX MONTHS!

AND WE DO IT ALL IN 72 HOURS OR LESS!!

TOTAL COST . . . $69.95, plus $7.50 shipping & handling

We also service the entire Commodore Line with a 72 hour turn-around time (subject to parts availability).

C-64	59.00
1541	65.00
1702	85.00
1525/801	59.00
1526/802	75.00
1541 Flash Installed	125.00

(Includes DOS Bridge and Switch for 100% Software compatibility)

Call for Repair Prices on other Commodore Equipment
We also repair Televideo Computers and Okidata Printers

WE DO WARRANTY REPAIRS! — Call for Details
$7.50 for shipping/$15.00 for APO/FPO or outside Continental US.
Our BBS No. is 919-765-3892, Temporary Password — TRIAD

TRIAD COMPUTERS
3068 TRENWEST DRIVE, WINSTON-SALEM, NC 27103
919-765-0433

How To Type In *COMPUTE!'s GAZETTE* Programs

Each month, COMPUTE!'s GAZETTE publishes programs for the VIC-20, Commodore 64, Plus 4, and 16. Each program is clearly marked by title and version. Be sure to type in the correct version for your machine. Also, carefully read the instructions in the corresponding article. This can save time and eliminate any questions which might arise after you begin typing.

We publish two programs, which appear periodically, designed to make your typing effort easier: The Automatic Proofreader, and MLX, designed for entering machine language programs.

When entering a BASIC program, be especially careful with DATA statements as they are extremely sensitive to errors. A mistyped number in a DATA statement can cause your machine to "lock up" (you'll have no control over the computer). If this happens, the only recourse is to turn your computer off then back on, erasing whatever was in memory. So be sure to *save a copy of your program before you run it.* If your computer crashes, you can always reload the program and look for the error.

Special Characters

Most of the programs listed in each issue contain special control characters. To facilitate typing in any programs from the GAZETTE, use the following listing conventions.

The most common type of control characters in our listings appear as words within braces: {DOWN} means to press the cursor down key; {5 spaces} means to press the space bar five times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing another key), the character is underlined. For example, A means hold down the the SHIFT key and press A. You may see strange characters on your screen, but that's to be expected. If you find a number followed by an underlined key enclosed in braces (for example, {8 A}), type the key as many times as indicated (in our example; enter eight SHIFTed A's). To type {SHIFT-SPACE}, hold down the SHIFT key and press the space bar.

If a key is enclosed in special brackets, ⟦ ⟧, hold down the Commodore key (at the lower left corner of the keyboard) and press the indicated character.

Rarely, you'll see a single letter of the alphabet enclosed in braces. This can be entered on the Commodore 64 by pressing the CTRL key while typing the letter in braces. For example, {A} means to press CTRL-A.

The Quote Mode

Although you can move the cursor around the screen with the CRSR keys, often a programmer will want to move the cursor under program control. This is seen in examples such as {LEFT}, and {HOME} in the program listings. The only way the computer can tell the difference between direct and programmed cursor control is *the quote mode.*

Once you press the quote key, you're in quote mode. This mode can be confusing if you mistype a character and cursor left to change it. You'll see a reverse video character (a graphics symbol for cursor left). In this case, you can use the DELete key to back up and edit the line. Type another quote and you're out of quote mode. If things really get confusing, you can exit quote mode simply by pressing RETURN. Then just cursor up to the mistyped line and fix it.

When You Read:	Press:	See:
{CLR}	SHIFT + CLR/HOME	
{HOME}	CLR/HOME	
{UP}	SHIFT + CRSR ↕	
{DOWN}	CRSR ↕	
{LEFT}	SHIFT + CRSR ↔	
{RIGHT}	CRSR ↔	
{RVS}	CTRL + 9	
{OFF}	CTRL + 0	
{BLK}	CTRL + 1	
{WHT}	CTRL + 2	
{RED}	CTRL + 3	
{CYN}	CTRL + 4	

When You Read:	Press:	See:
{PUR}	CTRL + 5	
{GRN}	CTRL + 6	
{BLU}	CTRL + 7	
{YEL}	CTRL + 8	
{F1}	f1	
{F2}	SHIFT + f1	
{F3}	f3	
{F4}	SHIFT + f3	
{F5}	f5	
{F6}	SHIFT + f5	
{F7}	f7	
{F8}	SHIFT + f7	

When You Read:	Press:	See:
←	←	
↑	SHIFT + ↕	

For Commodore 64 Only

When You Read:	Press:	See:
⟦1⟧	C= + 1	
⟦2⟧	C= + 2	
⟦3⟧	C= + 3	
⟦4⟧	C= + 4	
⟦5⟧	C= + 5	
⟦6⟧	C= + 6	
⟦7⟧	C= + 7	
⟦8⟧	C= + 8	

The Automatic Proofreader

"The Automatic Proofreader" will help you type in program listings from COMPUTE!'s Gazette without typing mistakes. It is a short error-checking program that hides itself in memory. When activated, it lets you know immediately after typing a line from a program listing if you have made a mistake. Please read these instructions carefully before typing any programs in COMPUTE!'s Gazette.

Preparing The Proofreader

1. Using the listing below, type in the Proofreader. The same program works on both the VIC-20 and Commodore 64. Be very careful when entering the DATA statements — don't type an l instead of a 1, an O instead of a 0, extra commas, etc.

2. SAVE the Proofreader on tape or disk at least twice *before running it for the first time.* This is very important because the Proofreader erases this part of itself when you first type RUN.

3. After the Proofreader is SAVEd, type RUN. It will check itself for typing errors in the DATA statements and warn you if there's a mistake. Correct any errors and SAVE the corrected version. Keep a copy in a safe place — you'll need it again and again, every time you enter a program from COMPUTE!'s Gazette.

4. When a correct version of the Proofreader is RUN, it activates itself. You are now ready to enter a program listing. If you press RUN/STOP-RESTORE, the Proofreader is disabled. To reactivate it, just type the command SYS 886 and press RETURN.

Using The Proofreader

All VIC and 64 listings in COMPUTE!'s Gazette now have a *checksum number* appended to the end of each line, for example ":rem 123". *Don't enter this statement when typing in a program.* It is just for your information. The rem makes the number harmless if someone does type it in. It will, however, use up memory if you enter it, and it will confuse the Proofreader, even if you entered the rest of the line correctly.

When you type in a line from a program listing and press RETURN, the Proofreader displays a number at the top of your screen. *This checksum number must match the checksum number in the printed listing.* If it doesn't, it means you typed the line differently than the way it is listed. Immediately recheck your typing. Remember, don't type the rem statement with the checksum number; it is published only so you can check it against the number which appears on your screen.

The Proofreader is not picky with spaces. It will not notice extra spaces or missing ones. This is for your convenience, since spacing is generally not important. But occasionally proper spacing *is* important, so be extra careful with spaces, since the Proofreader will catch practically everything else that can go wrong.

There's another thing to watch out for: if you enter the line by using abbreviations for commands, the checksum will not match up. But there is a way to make the Proofreader check it. After entering the line, LIST it. This eliminates the abbreviations. Then move the cursor up to the line and press RETURN. It should now match the checksum. You can check whole groups of lines this way.

Special Tape SAVE Instructions

When you're done typing a listing, you must disable the Proofreader before SAVEing the program on tape. Disable the Proofreader by pressing RUN/STOP-RESTORE (hold down the RUN/STOP key and sharply hit the RESTORE key). This procedure is not necessary for disk SAVEs, *but you must disable the Proofreader this way before a tape SAVE.*

SAVE to tape erases the Proofreader from memory, so you'll have to LOAD and RUN it again if you want to type another listing. SAVE to disk does not erase the Proofreader.

Since the Proofreader is a machine language program stored in the cassette buffer, it will be erased during a tape SAVE or LOAD. If you intend to type in a program in more than one sitting or wish to make a safety SAVE, follow this procedure:

1. LOAD and RUN the Proofreader.
2. Disable it by pressing RUN/STOP-RESTORE.
3. Type the following three lines in direct mode (without line numbers):

```
A$="PROOFREADER.T":B$="{10 SPACES}":FO
RX=1TO4:A$=A$+B$:NEXTX
FORX=886 TO 1018:A$=A$+CHR$(PEEK(X)):N
EXTX
OPEN1,1,1,A$:CLOSE1
```

After you type the last line, you will be asked to press RECORD and PLAY. We recommend you start at the beginning of a new tape.

You now have a new version of the Proofreader (PROOFREADER.T, as renamed in the above code). Turn your computer off and on, then LOAD the program you were working on. Put the cassette containing PROOFREADER.T into the tape unit and type:

OPEN1:CLOSE1

You can now get into the Proofreader by typing SYS 886. To test this, PRINT PEEK (886) should return the number 173. If it does not, repeat the steps above, making sure that A$ (PROOFREADER.T) contains 13 characters and that B$ contains 10 spaces.

The new version of Automatic Proofreader will load itself into the cassette buffer whenever you type OPEN1:CLOSE1 and PROOFREADER.T is the next program on your tape. It will not disturb the contents of BASIC memory.

Automatic Proofreader For VIC And 64

```
100 PRINT"{CLR}PLEASE WAIT...":FORI=886TO
    1018:READA:CK=CK+A:POKEI,A:NEXT
110 IF CK<>17539 THEN PRINT"{DOWN}YOU MAD
    E AN ERROR":PRINT"IN DATA STATEMENTS.
    ":END
120 SYS886:PRINT"{CLR}{2 DOWN}PROOFREADER
     ACTIVATED.":NEW
886 DATA 173,036,003,201,150,208
892 DATA 001,096,141,151,003,173
898 DATA 037,003,141,152,003,169
904 DATA 150,141,036,003,169,003
910 DATA 141,037,003,169,000,133
916 DATA 254,096,032,087,241,133
922 DATA 251,134,252,132,253,008
928 DATA 201,013,240,017,201,032
934 DATA 240,005,024,101,254,133
940 DATA 254,165,251,166,252,164
946 DATA 253,040,096,169,013,032
952 DATA 210,255,165,214,141,251
958 DATA 003,206,251,003,169,000
964 DATA 133,216,169,019,032,210
970 DATA 255,169,018,032,210,255
976 DATA 169,058,032,210,255,166
982 DATA 254,169,000,133,254,172
988 DATA 151,003,192,087,208,006
994 DATA 032,205,189,076,235,003
1000 DATA 032,205,221,169,032,032
1006 DATA 210,255,032,210,255,173
1012 DATA 251,003,133,214,076,173
1018 DATA 003
```

NEWS & PRODUCTS

One member of General Electric's new family of computer peripherals is this combination acoustic/direct-connect modem.

GE Enters Peripheral Market

General Electric has introduced a complete line of computer peripherals, all compatible with Commodore computers.

The Model 3-8100 is a letter-quality thermal transfer printer. The Model 3-8150 interface emulates Commodore printers, and operates in either transparent or emulation mode. Both the printer and interface come with a two-year warranty. The printer retails for $299.95, the interface for $89.95.

The Model 3-8200 is a combination direct connect/acoustic 300-baud modem. It can operate off 9-volt batteries when AC power is unavailable. Price is $119.95.

The GE Program Recorder (Model 3-5156) features a digital program indicator, variable tone and data level controls, and a complete jack pack for interfacing. A Commodore interface cable is included. Suggested retail price is $69.96.

Two combination monitor/TVs are also available. Model 13BC5509 ($489.95) is a 13-inch composite color monitor; Model 12XR5204 ($129.95) is a 12-inch black and white monitor.

General Electric Company, Electronics Park, Syracuse, NY 13221

Circle Reader Service Number 245.

Memory Trainer

The Einstein Memory Trainer, a new release from Avant-Garde Publishing, is made up of five lessons that lead the user through techniques for remembering people's names, lists of words and numbers, and important dates and phone numbers. It also contains a game called *Memory Mix* for applying what was learned in the lessons. For the Commodore 64 with a disk drive; suggested retail is $49.95.

Avant-Garde Publishing Corp., P.O. Box 30160, 1907 Garden Ave., Eugene, OR 97403

Circle Reader Service Number 246.

Printer Interface For Commodore

QR&D Software Research & Development has introduced a parallel interface that plugs into any standard Commodore printer port. The Graphic Printer Cable has a switch-selectable Commodore graphics mode that allows compatibility with most popular printers. It emulates the standard Commodore printers, insuring total compatibility with Commodore software. The GPC is also compatible with software written for use with printers using Cardco interfaces. A 2K buffer is standard. List price of the interface is $129.

QR&D Software Research & Development, One West Lake St., Suite 320, Minneapolis, MN 55408

Circle Reader Service Number 247.

Musical Improvisation Software

Algo-Rhythm Software has released *Cantus, The Music Improvisor*, for the Commodore 64. Created by composer and performer Michael Riesman, the program lets the user select tempo, harmony, rhythm, counterpoint, voice range, and tone color. It then creates a three-voice improvisation, while showing a graphic realtime display of the notes *Cantus* is playing. No musical knowledge is required. *Cantus* is available for $54.00 plus $2.00 shipping.

Algo-Rhythm Software, 176 Mineola Blvd., Mineola, NY 11501

Circle Reader Service Number 248.

3-D Graphics Program

Graph-Tech Software has released *3-D World 64*, a graphics program which enables the creation of complex three-dimensional objects. The designs can then be viewed and altered on the screen or plotted as line-art to the

Commodore 1520 Plotter/Printer. The program also allows the rotation of images on the screen.

3-D World 64 is available on a disk which includes sample images. Also accompanying the program is a 50-page manual. Suggested retail is $39.95.

Graph-Tech Software Co., 1315 Third Ave., No. 4C, New York, NY 10021

Circle Reader Service Number 249.

Home Medical Software For 64

Family Medical Advisor, a new program from Navic Software, can diagnose illness, poisoning, or the effects of drug abuse. The user responds "yes" or "no" to a series of questions in layman's terms. The program analyzes the data with a database of nearly 200 medical conditions, then displays the probable condition along with related disorders with similar symptoms.

The program is on disk only for the Commodore 64, and lists for $38.

Navic Software, North Palm Beach, FL 33408

Circle Reader Service Number 250.

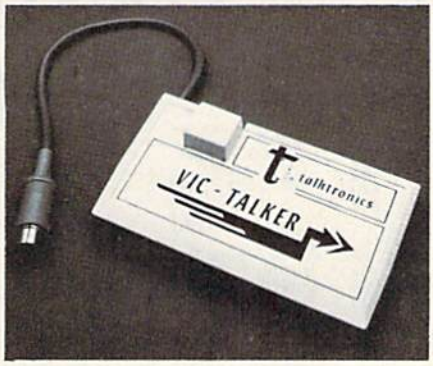
Arcade-Style Word Game

New from DLM is *Boppie's Great Word Chase*, an educational game for children in grades one through eight. Players move the character Boppie up and down ladders and around obstacles to gather letters and build words. The program has eight levels of play, with 256 built-in words of varying length and complexity.

Other options available include selecting one or two players, speed of play, and sound and on-screen instructions. For the 64 with a disk drive; suggested price is $29.95.

DLM, Inc., One DLM Park, Allen TX 75002

Circle Reader Service Number 251.



The VIC-TALKER, *by Talktronics, is a speech synthesis cartridge for the VIC-20.*

Speech Synthesis For VIC-20

The *VIC-TALKER*, from Talktronics, Inc., is a speech synthesis cartridge that works with the unexpanded Commodore VIC-20. It provides unlimited vocabulary translation of text to synthesized speech using advanced English language pronunciation rules and a user-expandable exception memory.

Voice mode options allow the user to "proofread" (by calling out punctuation and symbols in a second voice); use different voice inflections; and sing within a range of seven octaves. Suggested retail price is $89.

Talktronics, Inc., 27341 Eastridge Ave., El Toro, CA 92630

Circle Reader Service Number 252.

Graphics Integrator

Inkwell Systems has released *The Graphics Integrator*, a graphics package which allows the user to convert picture files from one graphics package for use in another, with graphics programs such as *Flexidraw, Doodle, Paint Magic, Koala, Peripheral Vision*, and *Tech Sketch*.

Also possible with *The Graphics Integrator* are integration of text and pictures with some word processing programs, creation of stand-alone picture files that can be loaded as programs, and creation of self-running slide shows with some packages. Suggested retail price is $29.95.

Inkwell Systems, 7677 Ronson Rd., San Diego, CA 92138

Circle Reader Service Number 253.

Super Sketch For Disk

Personal Peripherals has released a disk version of the *Super Sketch* graphics tablet for the 64 called the G2150. The tablet enables the user to create color graphics on the screen by moving the stylus over the pad. Also included on the disk are a printer utility and starter art kit. Suggested retail is $29.95.

Personal Peripherals, Inc., 1505 S. Green, Longview, TX 75602

Circle Reader Service Number 254.

Air Traffic Control Simulator

Kennedy Approach, from MicroProse Software, puts you behind the air traffic controls of some of the nation's busiest airports. Your job is to bring all the aircraft in on one runway, keeping the air space safe for approaching planes until it's their turn. *Kennedy Approach* is a speaking simulation; it allows you to communicate with all of the aircraft via computer-generated speech. Suggested retail price is $34.95.

MicroProse Software, 120 Lakefront Drive, Hunt Valley, MD 21030

Circle Reader Service Number 255.

New Product releases are selected from submissions for reasons of timeliness, uniqueness, available space, and general interest. Readers should be aware that News & Products often contains an edited version of material submitted by vendors. We are unable to vouch for its accuracy at time of publication.

Lyco Computer

Marketing & Consultants

SAVE ON THESE IN STOCK PRINTERS

AXION
GP 550 AT (Atari)	249
GP 550 CD (C-64)	249
GP 550 PC (IBM)	239
GP 550 AP (Apple)	279
GP 700 AT (Atari)	459
GP 700 AP (Apple)	459
Elite 5CD (C-64)	329

BLUE CHIPS
M12010	$275
M12010 C-64	$275

C. ITOH
Prowriter 8510 AP	279
8510 BC2	389
8510 BP1	319
8510 SP	379
8510 SR	429
8510 SCP	459
8510 SCR	479
7500 AP	205
7500 AP	245
1550 P	449
1550 BCD	489
A-10-20-P	459
F 10 40 PU or RDU	888
F10 SSPU or RDU	1069

CARDCO
LQ1	369
LQ3	279

CITIZEN
MSP-10	329
MSP-15	499
MSP-20	479
MSP-25	649

COMREX
CR-II-EC Comriter IIE Parallel	359
CR-II-ES Comriter II E Parallel	379
CR-IV-C Comriter IV Parallel	689
CR-IV-S Comriter IV Serial	689

Corona
LP300 Laser Printer	2699
200361 Toner Cartridge	89

DIGITAL DEVICES
16K printer buffer	99.75
32K printer buffer	119.75
64K printer buffer	169.95

EPSON
RX-80	225
RX-80 FT+	279
FX100+	579
JX 80	529
LQ 1500 P	1089
LQ 1500 S	1149
HI-80 Color Plotter	399

JUKI
Juki 6100	379
RS 232 Serial Board	55
Tractor	119
Sheet Feeder	209
Juki 6300	769

LEGEND
880	219
1080	239
1200	249

★ PRINTER INTERFACING Available ★

MANNESMANN TALLY
Spirit 80	255
MTL-160L	549
MTL-180L	739

NEC
NEC 8025	$699
NEC 8027	$359

OKIDATA
Okimate 10	179
82A	295
84	645
92	349
93	565
92 Imagewriter	425
92 IBM Version	349

OLIVETTI
DY 250 Parallel	739
DY 250 Serial	729
DY 450 Parallel	1099
DY 450 Serial	1079

PANASONIC
1090	189
1091	259
1092	395
1093	589
3151	459

Smith Corona
Fastext 80	189.00
D100	219.00
D200	399.00
D300	519.00
L1000	339.00

STARMICRONICS
SG-10	219
SG-15	379
SD-10	339
SD-15	445
SR-10	489
SR-15	585
Powertype	309
Gemini 10X	CALL
Gemini 15X	CALL
SB-10	CALL

MONITORS

AMDEK
300 Green	125
300 Amber	139
310 Amber IBM	155
Color 300 Audio	245
Color 500 Composite	369
Color 600	429
Color 700	495
Color 710	569

GORILLA
12" Green	78
2" Amber	84

NEC
JB-1260 Green	95
JB-1201 Green	135
JC 1215 Color	235
JC 1216 RGB	375
JC1460 Color	265
JB-1205 Amber	139

PANASONIC
DT 1300 RG1 composite	329

PRINCETON GRAPHICS
MAX-12 Amber	189
HX-12 RGB	475
SR-12 RGB	599

SAKATA
SC-100 Color	219
STS1 Stand	29
SG 1000 Green	99
SA 1000 Amber	109

TAXAN
210 Color RBG	249
115 Green	119
116 Amber	125
400 Color RGB	275
410 Color RGB	339
420 Color IBM	429
121 Green IBM	139
122 Amber IBM	145

X-TRON
Comcolor I Composite Green	199

ZENITH
ZVM 122A Amber	84
ZVM 123G Green	75
ZVM 124 Amber IBM	129
ZVM 131 Color	275
ZVM 133 RGB	389
ZVM 135 Composite	449
ZVM 136 Hi Res Color	589

MODEMS

MICROBITS
MPP 1064 (C-64	69.95

TELE LEARNING
CM-250 (C-64)	65.00
CARDCO MOD-1 (C-64)	CALL
NESTRIDGE (C-64)	CALL
MITEY MO (C-64)	CALL
1660 AUTO MODEM (C-64)	85
COMPUSERVE	23.95

HAYES
Smartmodem 300	189
Smartmoden 1200	459
Smartmoden 1200B	389
Micromodem IIE	249
Micromodem 100	289
Chronograph	179
Smart Com II	75

DRIVES

MSD
SD1 Drive	229
SD2 Drive	469

INDUS
GT COMMODORE	249
CARDCO CSD-1	219

DISKETTES

MAXELL
5¼" MD-1	16.99
5¼" MD-2	23.75

(Box 10)

SKC (Box 10)
5¼" SKC-SSSD	10.99
5¼" SKC-SSDD	13.99
5¼" SKC-DSDD	15.99

ELEPHANT (Box 10)
5¼" SSSD	13.99
5¼" SSDD	15.99
5¼" DSDD	19.99

TOLL FREE 1-800-233-8760

MasterCard TO ORDER VISA

CALL TOLL FREE
800-233-8760
Customer Service 1-717-327-1825 Jersey Shore PA 17740

or send order to
Lyco Computer
P O Box 5088

RISK FREE POLICY

In-stock item shipped within 24 hours of order. No deposit on C.O.D. orders. Free shipping on prepaid cash orders within the Continental U.S. PA residents add sales tax. APO, FPO, and International orders add $5.00 plus 3% for priority mail service. Advertised prices show 4% discount for cash, add 4% for Master Card or Visa. Personal checks require 4 weeks clearance before shipping. All items subject to change without notice.

For your protection, we check for stolen credit cards.

Lyco Computer

Marketing & Consultants

COMPUTER CARE

BIB

DISK DRIVE CLEANER	$12.75
COMPUTER CARE KIT	$19.75

NORTRONICS DISK DRIVE CLEANER with software

PRINTING PAPER

3000 SHEETS FANFOLD	$42.75
1000 SHEETS FANFOLD	$19.75
1000 SHEET LETTER	$21.95
200 SHEETS LETTER	$8.99
150 RAG STATIONARY	$10.99
MAILING LABELS (1in.)	$9.95
14 x 11 1000 FANFOLD	$24.75

COMMODORE SOFT-WARE

INNOVATIVE CONCEPTS

Flip-n-File 10	3.50
Flip-n-File 15	8.25
Flip-n-File 25 Lock	17.95
Flip-n-File 50	17.25
Flip-n-File 50 Lock	22.95
Flip-n-File Rom	17.25

ADVENTURE

Diskey	32.95
Ultra Disassembler	32.95

WICO (Joysticks)

15-9714 Bat Handle	16.99
50-2002 Super 3-way	19.99
72-4545 Trackball	29,99
50-2030 Boss	12.99
50-0108 Grip Handle	19.99

COMMODORE

Simon's Basic	24.75
Assembler 64	34.75
Super Expander	22.75
Logo 64	49.75
Pilot 64	38.75
Easy Cale	34.75
Easy Script	38.75
C 64 Computer	CALL
C 1541 Disk Drive	195
MPS 801 Printer	175
C 1702 Monitor	209
C 1531 Datasette	39.75
C 1660 Auto Modem	85

BRODERBUND (C-64)

The Print Shop	29.95
Graphics Library	19.95
Whistler's Brother	19.95
Stealth	19.95
Spelunker	19.95
Bank St. Writer	32.95
Raid on Bungeling Bay	19.95
Championship Lode Runner	22.95
Lode Runner	19.95
Operation Whirlwind	22.95

PRINTER INTERFACE (C-64)

Grappler CD	89.95
Cardco ? G	65.75
Cardco ? B	39.75
Cardco ? PS	59.95
U-Print C	59.95
B.I. Interface	CALL
Connection: Epson	69.95
Connection: Star	69.95
Connection: Okidata	69.95
Connection: C.Ituh	69.95
Connection: Seikosha	69.95

SPINNAKER (C-64)

Delta Drawing (ROM)	22.75
Cosmic Life (ROM)	22.75
Alphabet Zoo (ROM)	19.95
Kindercomp (ROM)	17.95
Facemaker (ROM)	19.95
Fraction Fever (ROM)	19.95
Kids on Keys (ROM)	19.95

OR&D

Copy Q	27.95
GPC printer interface	65.00

SUBLOGIC (C-64)

Flight Simulator II	32.75
Night Mission Pinball	22.75

CARDCO

C/01 Write Now	29.95
C/02 Write Now - 64	39.95
D/01 Mail Now - 64	29.00
D/04 Spell Now - 64	29.00
D/02 Utility Desk	19.95
CSD-1 Disk Drive (new)	CALL
MOD-1 Modern (new)	CALL
D/03 Tax Payer (new)	27.95
D/07 Calc Now/64 (new)	27.95
D/08 SUper Printer Utility	
D/08 Super Printer Utility	27.95
CK/1 Numeric Key Pad	34.95
DC/1 Data Cassette	39.95
CB/5 5 Slot Board C-64	54.00
CR/1 Light Pen	29.75
CE/1 Cassette Interface	29.75
CB/3 3 Slot Board Vic-20	24.95
CB/6 6 Slot Board Vic-20	65.00

HES

HES Games 84	22.95
Omni Writer/Spell	34.95
HES Mon 64	23.95
Microsoft Multiplan	55.00
Type N Write	19.95
Turtle Graphics II	23.95
Cell Defense	22.95
Paint Brush	12.95
Tri Math	22.95
Graphics Basic	27.95
HES Kit	29.95
Millionaire	23.95
64 Forth	24.95
HES Writer 64	24.9'

Timeworks

Inventory	$32.75
Sales	$32.75
Accts. Rec	$32.75
Accts. Rec	$32.75
G. Ledger	$39.75
Data Mgr	$14.75
Checkbook	$14.75
Star Battle	$14.75
Cave of Word	$18.75

CONTINENTAL (C-64)

Home Accountant	44.75
1984 Tax Advantage	35.75
1985 C-64 Book of Software	16.95

Batteries Included

Paper Clip	$59.95
Spell Pak	$34.95
Consultant	$64.95
Paper Clip with Spell Pak	$79.95
Home Pak	$34.95
BUS CARD	$139.95
80 Column Board	$109.95

Scarborough

Songwriter	$24.75
Phi Beta F	$29.95
Mastertype	$24.75
Run f Money	$24.75
Net Worth	$49.95

EASTERN HOUSE

Rabbit C-64	19.95
Rabbit VIC-20	19.95
MAE C-64	27.95
Telstar 64	19.95
M.L. Monitor 64	18.95

SS1 (C-64)

Computer Baseball	24.75
Field of Fire	24.75
Computer Quarterback	24.75
Questron	24.75
50 Mission Crush	24.75

Microprose

Solo Flight	$22.75
NATO	$22.75
Spitfire	$19.95
F-15 Strike	$22.75
Air Rescue	$22.75

EPYX (C-64)

Fast Load	26.75
Breakdance	23.75
Greatest Baseball	24.75
Summer Games	26.75

PERSONAL PERIPHERALS

Super Sketch 64	32.75
Printer Utility	18.75

KOALA (C-64)

Koala Pad	59.95

PRECISION SOFTWARE

Superbase 64	52.75

AMERICA'S MAIL ORDER HEADQUARTERS

LYCO COMPUTER

WORLD'S LEADER IN SALES & SERVICE

TO ORDER
CALL TOLL FREE
800-233-8760
In PA 1 717-327-1824
Lyco Computer
P.O. Box 5088
Jersey Shore, PA 17740

SYMBOL MASTER™

MULTI-PASS SYMBOLIC DISASSEMBLER FOR THE COMMODORE 64*

disassembles any 6502/6510 machine code program into beautiful source

- Learn to program like the experts!
- Adapt existing programs to your needs!
- Automatic LABEL generation.
- Outputs source code files to disk fully compatible with your MAE,* PAL,* CBM* or Develop-64* assembler, ready for re-assembly and editing!
- Outputs formatted listing to screen and printer.
- Automatically uses NAMES of Kernal jump table routines and all operating system variables.
- Generates list of equates for external addresses.
- Generates complete cross-referenced symbol table.
- Recognizes instructions hidden under BIT instructions.
- 100% machine code for speed.

(Symbol Master™ is not copy protected.)

ORDER NOW! Available on disk only. Introductory price $49.95 postpaid USA.

*MAE is a trademark of Eastern House.
PAL is a trademark of Pro-Line.
Commodore 64 is a trademark and CBM is a registered trademark of Commodore.
Develop-64 is a trademark of French Silk.

UNLEASH THE POWER OF YOUR COMMODORE 64 WITH THE ULTIMATE INTERFACE

- Control & monitor your home — appliances, lights & security system
- Intelligently control almost any device
- Connect to Analog-to-Digital Converters
- Control Robots
- Perform automated testing
- Acquire data for laboratory & other instrumentation applications
- Many other uses.

Don't make the mistake of buying a limited capability interface. Investigate our universally applicable Dual 6522 Versatile Interface Adapter (VIA) Board, which plugs into the expansion connector and provides:

Four 8-bit fully bidirectional I/O ports & eight handshake lines • Four 16-bit timer/counters • Full IRQ interrupt capability • Four convenient 16-pin DIP socket interface connections • Expandability up to four boards & sixteen ports.

ORDER NOW! Price $169, postpaid USA. Extensive documentation included. Each additional board $149.

COMMODORE 64™ SOURCE CODE!

"What's Really Inside the Commodore 64"

• Most complete available reconstructed assembly language source code for the C-64's Basic and Kernal ROMs, all 16K. • You will fully understand calls to undocumented ROM routines, and be able to effectively use them in your own programs. • Uses LABELS. Not a mere one-line disassembly. All branch targets and subroutine entry points are shown. • TABLES are fully sorted out and derived. • Completely commented, no gaps whatsoever. You will see and understand the purpose of every routine and every line of code! • Complete listing of equates to external label references. • Invaluable fully cross-referenced symbol table.

Order C-64 Source. $29.95 postpaid USA.

All orders shipped from stock within 24 hours via UPS. VISA/MasterCard welcomed.

SCHNEDLER SYSTEMS

1501 N. Ivanhoe, Dept. , Arlington, VA 22205
Information/Telephone Orders (703) 237-4796

PRICE BUSTERS

software * books * supplies for
apple ** atari ** commodore ** ibm-pc ** pc-jr
games * education * home management
business * utilities * systems
on
disks cartridges cassettes

Our prices are 25% to 50% or more below retail.
We have thousands of different computer items.
And, YES, they are the Real Thing...NOT COPIES.
Please call or write for our current price list.
--> Be sure to tell us what computer you have.

>CODE for this PRICE LIST<

A=Apple II+ D=Apple MAC G=C/64 Disk I=IBMpc
B=Apple IIC E=Atari Disk H=C/64 Cart J=PCjr
C=Apple IIE F=Atari Cart

e = Educational h = Home Use r = Recreational

Type of Computer:	Store Price	Our Price	Name of Program/Item
ABC.E.G.IJ	$40 e	$26	Agent USA.48k(Atari $22)
ABC.E.G.IJ	$40 r	$28	Archon (Electronic Arts)
ABC.E.G...	$40 r	$28	Archon II: Adept (E.Arts)
ABC.E.G...	$40 r	$26	Bruce Lee. 48k
ABC.E.G.I.	$30 r	$20	Castle Wolfenstein. 32k
.BC.E.G.IJ	$50 r	$35	Cut & Paste Word Processer
ABCD..G.IJ	$50 r	$32	Deadline (Infocom)
ABC.E.G.IJ	$35 e	$23	Early Games-Young Children
.....H..	$40 h	$26	Fast Load Cartridge (Epyx)
ABC.E.G...	$40 r	$26	50 Mission Crush (S.S.I.)
ABCDE.G.IJ	$50 h	$35	Financial Cookbook (E.Art)
ABC.E.G.IJ	$50 h	$35	Flight Simulator II
AB.DE.GHI.	$35 r	$23	Frogger (MAC $27)
ABC.E.G.IJ	$35 r	$25	Hard Hat Mack (Elect.Arts)
ABC.E.G...	$75 h	$49	Home Acct. (Arrays/Cont'l)
.....IJ	$150 h	$99	Home Acct.Plus (Array/Con)
ABC...G...	$70 h	$35	Homeword (Sierra On Line)
....E...I.	$70 h	$45	Homeword (Sierra On Line)
ABCDE.GHIJ	$35 r	$23	Lode Runner (MAC $27)
ABCDE.G.IJ	$40 e	$26	MasterType (MAC $33)
ABC...G.IJ	$50 e	$32	Math Blaster (Davidson)
ABC.E.G...	$25 e	$18	Memory Bldr:Concentration
....E.G...	$40 r	$28	M.U.L.E. (Electronic Arts)
ABC.E.G...	CALL e	CALL	Muppet Learning Keys
ABC.E.G.IJ	$40 r	$28	Murder on the Zinderneuf
ABC.E.G.IJ	$40 r	$28	Music Construction Set
ABC.....	$50 eh	$33	Newsroom. 64k (Great!!)
ABC.E.G.IJ	$40 r	$28	1 on 1: L.Bird & J.Erving
ABCDE.G.IJ	$40 r	$28	Pinball Construction Set
ABC.E.G...	$50 h	$32	Print Shop (Broderbund)
AB...F.HI.	$35 r	$21	Robotron (Atari)
ABC.E.G...	$20 r	$15	Sargon II (Hayden)
ABCD..G.IJ	$50 r	$32	Sargon III (Hayden)
ABC.E.G.IJ	$40 r	$28	7 Cities of Gold (E.Arts)
ABC...G...	$40 r	$28	Sky Fox (Electronic Arts)
ABC...G.IJ	$70 e	$45	Speed Reader II (Davidson)
ABC...G.IJ	$40 e	$26	Spellicopter (Designware)
ABC.E.G.IJ	$40 r	$26	Summer Games (IBM Sept.85)
ABCD..G.IJ	$35 r	$23	Transylvania (MAC $27)
ABCD..G.IJ	$40 r	$26	Trivia Fever. 48k (Prof'l)
ABCD..G.I.	$50 e	$32	Typing Tutor III (Simon&S)
ABC.E.G.IJ	$60 r	$39	Ultima II,III (each). 48k
ABC...G.IJ	$50 e	$32	Word Attack (Davidson)
ABC.E.G...	$80 h	$52	Your Personal Net Worth
.....IJ	$100 h	$65	Your Personal Net Worth
ABCD.....	$45 r	$29	Zork 1,2,3. (each)
.....G.IJ	$40 r	$26	Zork 1,2,3. (each)

* THE FINE PRINT *

California Buyers Only: Please add 6% Sales Tax.
Shipping Cost for Software within Cont.48 states:
UPS Ground: 1 Item = $3. Thereafter, $1.50 ea.
UPS Air : 1 Item = $5. Thereafter, $2.00 ea.
Air Mail : 1 Item = $5. Thereafter, $3.00 ea.
Alaska, Hawaii, FPO/APO, Canada: Same as Air Mail
VISA & M/CARD: Please add 3% to the above cash prices. Also include: Card #; Expiration Date; and Cardholder's signature.
Cashier Check/Credit Card/Money Orders usually shipped out within 24 hrs. Other checks: 2 wks.
Public/Parochial School Purchase Orders Accepted.
This ad was submitted on February 9th, therefore, Price/Availabilty subject to change. In case of problems, your phone # will help us notify you.

FAMILY DISCOUNT
COMPUTER PRODUCTS
250-2 So.Orange Ave.#540
Escondido, CA 92025

Phone: (619) 489-1040

>We REBATE $1. on Phone Orders<

FOR COMMODORE 64

• TRACKMIMIC™ •

Why nibble when you can
— Gulp —
Hardware/Software Protected Disk Backup System
Installs in 1541 Drive in Minutes
Just Plug It In!!
2 Minutes For Full Disk Backup!!
Features include:
Automatic Operation, Hyperscan
Sector Edit (GCR), Bit Density, Tracks 1-45
• For All New Protection Methods •

89.95

• DISKMIMIC 5+™ •

Our Famous Automatic Backup System

49.95

DISKAT - Cataloging Program

Reads data directly from Disk, Holds 8000 Files, Makes Labels, Recalls 12 Way's, Alphabetizes Files, Printer/Screen Output.

34.95

A.I.D. CORP.
4020 Hempstead Turnpike • Bethpage, New York 11714
(516) 731-7100
Diskmimic 5™ is a trademark of A.I.D. Corporation
Commodore 64™ & 1541™ is a trademark of Commodore Electronics, Ltd.
Shipping & Handling — $1.50 each

THE ULTIMATE SIMULATION

STAR TREK KING

THE GAME

Version II

For The 64

- Impressive Graphics With Hi-Res Features
- Realistic Sound
- Strategic Thought Involvement
- The Only Game That Parallels The T.V. Series And Movies

UFLAND SOFTWARE (Disk Only)

Dept. S.
P.O. Box 1324
Meaford, Ont.
N0H 1Y0 Canada
(519) 538-1758

$21.95 Cdn. $19.95 U.S.

Ont. Residents Add 7% Provincial Sales Tax

Dealer Inquiries Invited

Even Spock Would Find It Challenging

COMPUTER MAIL ORDER

THE CMO ADVANTAGE

- THE BEST PRICES! We will meet or beat any qualified price you find.
- Next day shipping on all in stock items.
- Free easy access order inquiry.
- Orders from outside Pennsylvania and Nevada save state sales tax.
- Free technicial support with our factory trained technical staff.
- There is no limit and no deposit on C.O.D. orders.
- There's no extra charge for using your credit card. Your card is not charged until we ship.
- We accept purchase orders from qualified corporations. Subject to approval.
- Educational discounts available to qualified institutions.
- FREE CATALOG MEMBERSHIP.

ORDER LINE

1-800-233-8950
In PA 1-800-242-4215

CUSTOMER SERVICE AND TECH SUPPORT
1-717-327-1450

MAILING ADDRESS

EAST
Dept. A406, 477 E. Third St.
Williamsport, PA 17701

WEST
Dept. A406, P.O. Box 6689
Stateline, NV 8944

MEMBER DIRECT MARKETING ASSOCIATION

CREDIT CARDS

VISA MasterCard AMERICAN EXPRESS DINERS CLUB

SHIPPING

Add 3%, minimum $5.00 shipping and handling on all orders. Larger shipments may require additional charges.

All items subject to availability and price change.

Returned shipments may be subject to a restocking fee.

CANADIAN ORDERS

1-800-268-3974
Ontario/Quebec

1-800-268-4559
Other Provinces

1-416-828-0866
In Toronto

TELEX: 06-218960

2505 Dunwin Drive,
Mississauga, Ontario
Canada L5L1T1

All prices shown are for U.S.A. orders.
Call The Canadian Office for Canadian prices.

PRINTERS

AXIOM
GP-100 Parallel.....$189.00
GP-550 Dual Mode.....$269.00

BMC
BX-80 Dot Matrix.....$229.00

CITIZEN
MSP-10.....$349.00
MSP-15.....$539.00

C.ITOH
Prowriter 750.....$219.00
Prowriter 8510P.....$299.00
Prowriter 1550P.....$469.00
F10-40P Starwriter.....$869.00

EPSON
RX-80, RX-80FT, RX-100, FX-80, FX-100, LX80.....CALL

JUKI
6100.....$399.00

MANNESMANN TALLY
160L.....$529.00
180L.....$649.00
Spirit 80.....$239.00

NEC
8027 Dot Matrix.....$319.00

OKIDATA
82, 83, 84, 92, 93, 180.....CALL
Okimate-64.....$199.00

OLYMPIA
Compact 2.....$439.00
Compact RO.....$399.00
Needlepoint Dot Matrix.....$329.00

Panasonic.
Panasonic 1090.....$199.00
Panasonic 1091.....$279.00

RITEMAN
C Plus.....CALL

SILVER-REED
400 Letter Quality.....$279.00
500 Letter Quality.....$329.00
550 Letter Quality.....$429.00
770 Letter Quality.....$779.00

star
SG10.....$239.00
SG15.....$399.00
POWER TYPE.....$329.00

TOSHIBA
1340.....$599.00
1351.....$1259.00

INTERFACES

AXIOM
C64 Parallel Int.....$69.99

DIGITAL DEVICES
U-Print C.....$59.99

Orange Micro
Grappler CD Interface.....$99.99

TYMAC
C64 Printer Interface.....$89.99

Super Sketch Graphics Pad.....$39.99

Koala
C64 Koala Pad ROM.....$59.99

COMMODORE

Commodore 128 LCD CALL

SX-64 Portable.....$499.00
Commodore 64.....$149.00
CBM 4 Plus.....$199.00

M-801 Dot Matrix Parallel.....$189.00
M802 Serial.....$219.00
MCS 803 Dot Matrix.....$179.00
1520 Color Printer/Plotter.....$129.00
1530 Datasette.....$39.99
1541 Disk Drive.....$199.00
1660 Auto Modem.....$59.99
1702 Color Monitor.....$199.00
DPS Daisywheel Printer.....$339.00
Desk Organizer Lock.....$49.99
1311 Joystick...each.....$5.99
1312 Paddles.....$11.99
1110 VIC 8K.....$42.99
1111 VIC 16K.....$69.99
1211 Super Expander.....$53.99

1541
SD 1 Disk Drive.....$269.00
SD 2 Disk Drive.....$469.00

INDUS
GT-C64 Drive.....$259.00

cardco, inc.
Light Pen.....$32.99
3 Slot VIC Expansion Interface.....$32.00
6 Slot Expansion Interface.....$79.99
Cassette Interface.....$29.99
Parallel Printer Interface.....$44.99
Parallel Interface w/Graphics.....$69.99
Cassette Deck.....$29.99

MONITORS

AMDEK
300 Green.....$129.00
300 Amber.....$149.00
New Color 300/Audio.....$259.00

BMC
9191 Color.....$199.00

NAP
12" Amber.....$64.99

NEC
JB 1201 Green.....$139.99
JB 1205 Amber.....$139.00
JB 1215 Color.....$229.00

Sakata
SC-100 Color.....$249.00
SG-1000 Green.....$129.00
SG-1000 Amber.....$139.00

TAXAN
100 12" Green.....$125.00
105 12" Amber.....$119.00
210 Color.....$239.00

ZENITH
ZVM122 Amber.....$84.99
ZVM123 Green.....$84.99
ZVM131 COLOR.....$299.00

MODEMS

TELE-LEARNING
C64 300 Baud.....$49.99

MPP MICROBITS
1064 300 Baud AD/AA.....$69.99

SOFTWARE

pfs:
File/Report.....(ea.) $59.99

Precision Software
Superbase 64 w/Audio.....$54.99

BATTERIES INCLUDED
Paperclip.....$59.99
Paperclip w/Spell Pack.....$79.99
SpellPak.....$39.99
The Consultant.....$69.99
Buscard II.....$139.99
B.I. 80 Display.....$139.99

commodore
Simons Basic.....$24.99
Assembler.....$19.99
Easy Finance I, II, III, IV.....$17.99
Gorf.....$12.99

INFOCOM
Zork I, II, III.....$27.99
Deadline.....$29.99
Witness.....$29.99

ELECTRONIC ARTS™
Music Construction.....$34.99
Pinball Construction.....$29.99
7 Cities of Gold.....$29.99
Archon II.....$29.99

HESWARE
Games' 84.....$16.99
Type 'N' Writer.....$14.99
Super Zaxxon.....$16.99
Cell Defense.....$14.99
Hes Writer 64.....$19.99

Continental Software
The Home Accountant.....$49.99

Professional Software
Trivia Fever.....$29.99
Fleet System II Word Processor..$59.99

SPINNAKER
Snooper Troops 1 or 2.....$24.99
Delta Drawing.....$29.99
Kids on Keys.....$29.99

SUB LOGIC
Flight Simulator II.....$39.99

synapse
Drelbs.....$16.99
Protector II.....$16.99
Sentinel.....$16.99

DISKETTES

maxell.
5¼" MD-1 SS/DD.....$17.99

Dennison
5¼" Elephant SS/SD EM-1.....$14.99

COMPUTER MAIL ORDER

CALL TOLL-FREE 1-800-233-8950

Dreams CAN come true!

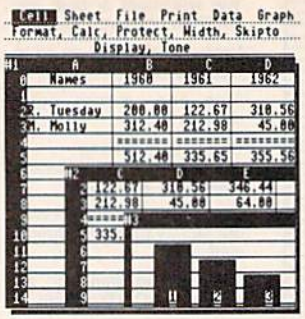
Back in June of 1983, Kelvin Lacy had a dream. He dreamed of creating one integrated program that would include a spreadsheet, business graphics *and* a database. A program with the power of Lotus 1-2-3. On the Commodore 64. People laughed! He had just finished OmniWriter, to be marketed by HESWARE. Ignoring the skeptical, he started on VIZASTAR.

Now, after 15 months, his dream has come true. VIZASTAR has a full-featured spreadsheet, as good as Multiplan. But much faster—faster than many spreadsheets on the IBM PC! It is written 100% in 6502 machine language code and is ALWAYS in memory. It is menu-driven, using the latest techniques in user-friendliness. It is compatible with virtually all printers and word processors. Up to 9 windows can be open simultaneously, anywhere. Remarkably, 10K of memory is available for spreadsheet use.

The database is equally impressive. Create file layouts by simply painting a picture of the layout on up to 9 screens, showing where a field starts and ends; VIZASTAR does the rest.

Imagine the power of a spreadsheet integrated with a database. Now add graphics — bar, line, and multi-color pie and 3-D "skyscraper" graphs. You could access a customer's profile in the database, transfer the data to the worksheet, and let it calculate discounts, sales tax etc. and then transfer the updated data back to the database. Open up a window anywhere and display a graph of your data, instantly. This integration is the key to VIZASTAR's power—the **first and only** program of this kind on the C-64. All commands can be automated, so you can "program" your own applications and run them with one keystroke.

Trademarks: Lotus 1-2-3/Lotus Development. Commodore 64/Commodore Electronics Ltd. Multiplan/Microsoft.



Actual screen dump printed by VIZASTAR

VIZASTAR includes a cartridge, a 1541 diskette with a backup, reference and tutorial manuals. VIZASTAR is ONLY $119.97. We are so positive you will be delighted with VIZASTAR that we offer a **15 day money-back** guarantee. Try it risk-free! Compare VIZASTAR with any other spreadsheet or database.

So order today. Call or send a check or Money Order. Calif. residents add 6.5% sales tax. MC/VISA accepted.
Add P&H: UPS—$3; COD, Canada—$6

SOLID STATE SOFTWARE

1125 E. Hillsdale Blvd., Suite 104
Foster City, CA 94404-1609
(415) 341-5606
Dealer Inquiries Welcome

PEEK A BYTE™ 64
DISK MECHANIC

PEEK A BYTE 64 Now with the DISK MECHANIC is the most powerful disk editor and memory utility available for the Commodore 64 and 1541 disk drive.

- Read or write sectors hidden by DOS header errors
- Read or write up to track 40 - half tracks too!
- Fast format single or multiple tracks up to track 40
- Over 50 functions - includes all PEEK A BYTE features
- Complete manual for beginners and pros
- Disk copy program included at no extra charge!
- Continuing program update policy.

PEEK A BYTE is a Trademark of Quantum Software.
To order send check or money order, US funds. Foreign add $4 for shipping and handling. Florida residents add 5% (or 6%) sales tax. COD orders add $2 plus postage and COD charges. Phone COD orders call (305) 840-0249

ALL THIS FOR ONLY
$35
U.S. Post Paid

QUANTUM SOFTWARE
P.O. Box 12716 Dept. 4 Lake Park, Florida 33403

STOP SOFTWARE PIRACY

Deadbolt-64 Disk Security System

- Complete program **encryption** and **security** against copying, even by the "bit copiers". Sophisticated system does not use "bad blocks" or cause drive knock. Fingerprint your own disks in 3 seconds. Stop probing monitors and more. **Complete system $99.95.** Call or write for details.

Other Products From Security

- **Telengard Character Generator.** Define your own characters. Get those level 6 spells. Make your characters immortal and more. **Only $12.50.**
- **ESP Investigator.** Investigate clairvoyance, precognition, ESP and more. For one or two people. Prove you have ESP — you can win **$10,000! Only $14.50.**
- **PDQ Copy.** 4 minute complete disk copy. No drive knock. Three passes, four minutes. Copies many protected disks. Affordable at **$14.50.**

SECURITY SOFTWARE
3021 E. State Road #4
La Porte, IN 46350
219-369-9219

Technical inquiries after 3:00 P.M. CST
Add $1.50 for shipping and handling on all orders.
VISA and MASTERCARD Welcomed

Sensational Prices!
. . . On Our Most Popular Items!

Introducing . . .

THE 99¢ DISKETTE

Are you paying too much for diskettes? Try our first quality, prime, 5¼" diskettes (no rejects, no seconds) at these fantasic sale prices and save, save, SAVE! Disks are packaged in boxes of 50; each box contains 5 shrink-wrapped 10-packs that include diskettes in sleeves, labels, and write-protect tabs.

Each diskette is certified to be 100% error free and comes with a lifetime warranty (if you have a problem, we'll replace the diskette). All diskettes include hub reinforcement rings and write-protect notch.

All diskettes are double density and work in either single or double density drives.

SS, DD Diskettes, Box of 50 **$49.50**-99¢ ea.!
32391

DS, DD Diskettes, Box of 50 **$74.50**-$1.49 ea.!
32403

COMPUTERFACTS™ from SAMS

Technical Service Data for Your Computer and Peripherals

Sams introduces COMPUTERFACTS™ . . . packets of information that reveal the inner workings of major brand micros, monitors, printers and disk drives. Includes schematic wiring diagrams, parts lists, disassembly instructions, troubleshooting techniques, and other repair data.

33477	Commodore 64 Computer	$17.95
33513	VIC-20 Computer	$17.95
33551	Commodore Plus/4 Computer	$17.95
33481	Commodore 1541 and VIC 1541 Disk Drives	$17.95
33496	Commodore 1525 Printer	$17.95
33508	Commodore C16 Printer	$17.95
33546	Commodore 1701 Monitor	$17.95
33527	Epson MX-80 FT Printer	$17.95
33458	Atari 400 Computer	$17.95
33462	Atari 800 Computer	$17.95
33532	TI 99/4A Computer	$17.95

COLOR DISPLAY MONITOR

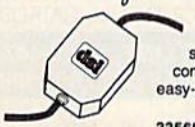
BMC USA

Enjoy the vivid color graphics and text possible with this quality, solid-state composite video monitor from BMC. 13" non-glare screen, 350 by 350 line resolution, built-in speaker. Convenient front panel controls.
Dimensions: 14.7"(W) x 13.4"(H) x 16.5"(D), 24 pounds.
23231 ONLY **$229**

MONITOR CABLE Connects above monitor to your Commodore Computer.
21082 **$7.99**

GRAPHICS PRINTER INTERFACE

PPI *with graphics*



The PPI (Parallel Printer Interface) from DSI is a high-performance graphics printer interface for your Commodore 64 or VIC-20, offered at an unbelievable price! The PPI fully emulates a Commodore printer so that all software written for Commodore computers and printers can be run with the PPI and most any parallel printer. Print true Commodore graphics and alpha-numerics as well as any special character sets offered by your specific printer. Works with Star, Epson, BMC, and many more. Comes complete with all necessary cables for quick installation and includes easy-to-follow user's manual.

33565 Parallel Printer Interface **$44.95**

NEW!

CARTRIDGE EXPANDER FROM Navarone!!!

STOP CARTRIDGE SWAPPING!!

NAVARONE

This Cartridge Expander plugs into the cartridge port on your Commodore 64 and lets you plug in up to three cartridges at a time. Select the program you want. Even reset the computer independently of the power switch!!

Save wear and tear on your cartridge and computer contacts. Handy and convenient!

33227 **$34.95**

DUST COVER and "EVERYTHING BOOK" INTRODUCTORY SPECIAL

Get to know us by ordering this great dust cover for your VIC-20 or Commodore 64 and our catalog, "The Everything Book for the Commodore C-64 and VIC-20 Home Computers," for $2.95 (no extra shipping or handling charges). Cover is antistatic, transluscent, 8 gauge vinyl sewn to our exacting standards with reinforced seams. Discover the savings and easy shopping available from Tenex Computer Express!

$2.95

31627 Dust Cover and Catalog

USE SINGLE SHEETS IN YOUR TRACTOR FEED PRINTER WITH

PAPER TRACTOR™

Paper Tractor carries ordinary sheet paper through your tractor–feed printer!
Simply place your letterhead, checks, invoices, forms, even legal–size sheets into the durable flexible plastic carrier and feed into your adjustable tractor–drive printer. Works with any printer, carries any paper.

22084 **$11.95**

From Your Friends At

TENEX Computer Express™

We gladly accept mail orders!

P.O. Box 6578
South Bend, IN 46660

Questions? Call 219/259-7051

Ad G1C

SHIPPING CHARGES

ORDER AMOUNT	CHARGE
less than $20.00	$2.75
$20.00-$39.99	3.75
$40.00-$74.99	4.75
$75.00-$149.99	5.75
$150.00-$299.99	6.75
$300 & up	7.75

MasterCard · AMERICAN EXPRESS · VISA

NO EXTRA FEE FOR CHARGES

ORDER TOLL FREE
1-800-348-2778

ATTENTION COMMODORE 64 OWNERS
DID YOU BUY THE WRONG PRODUCT?

WE'LL PAY YOU FOR YOUR MISTAKE!*

PRINTER INTERFACE BLUES

No graphics, doesn't work with your software, Bad aspect ratios, no available buffer, well you wouldn't have these problems with the **Micro-World M W-350.** We'll give you $59. off the list price of $129. for that strange interface that's causing you trouble.

LAST YEARS BACK UP SOFTWARE

Everyone has Back-up software that reproduces errors, but will it back up non-standard sectors, reproduce density frequency alterations alter the number of sectors, copy single sync bits, and reformat a single track? We don't think so. Send your antique back and recieve $25. credit toward the "New Revised Clone Machine" at $49.95. We've added an MSD dual drive Clone Machine also available for only $39.95. Upgrade your products to the latest state of the art today.

Other software products available from Micro-W include: Mr. Tester diagnostic software, Fantastic Filer data base and report generator, Screen Dumper 64, Font Factory/Sign writer for custom type and Jot-A-Word educational software, watch for our $49MIDI interface that will connect your Commodore 64 to musical instruments.

CALL - 201 - 838-9027
or write us at

Micro-W. DISTRIBUTING, INC

1342B Route 23
Butler, N.J. 07405

VISA MasterCard

*NOTE Micro-W reserves the right to cancel this offer at any time without notice

Dealer Dist. Inquires

DOUBLES DISK CAPACITY!

Cuts Your Cost 50%!

Now! The back of 5¼" diskettes can be used for data storage even with single head disk drives.

- ***NIBBLE NOTCH*** makes it easy
- Adds the notch needed.
- SATISFACTION OR MONEY BACK.

NIBBLE NOTCH I

Cuts square notch for Apple, II, II+, IIe, IIc, III, Franklin and Commodore.

only **$14.95***

*add $2.00 each order ($5.00 foreign)
For Postage and Handling
Florida Residents Add 5% Sales Tax

ORDER TODAY!

Toll Free 1-800-642-2536

VISA FLORIDA: 1-305-493-8355 MasterCard
OR SEND CHECK OR MONEY ORDER TO:

NIBBLE NOTCH® COMPUTER PRODUCTS

4211 NW 75th TERRACE, • DEPT. 1 4
LAUDERHILL, FL 33319

PATENTED ALL TRADEMARKS ARE ACKNOWLEDGED

AA COMPUTER EXCHANGE

"SOUTH'S LARGEST COMMODORE 64 DEALER"

OVER 2000 ITEMS IN STOCK

REQUEST OUR FULL CATALOG TODAY

ORDER LINE: 1-800-447-0088
INQUIRIES & FL: 904-388-0018

HARDWARE & ACC.		**SIGHT N' SOUND**	
C-64 Computer	Call	Keyboard	$34
C-128	Call	Synthesizer	34
1541 Disk Drive	Call	Processor	24
1702 Color Monitor	Call	**PRACTICORP**	
SFD 1001 1 Meg Drive	$399	64-Doctor	$20
MSD Dual Drive	499	Practicalc 64	37
Indus GT Disk Drive	269	Practifile	37
1660 Auto Modem	79	PS: Spreadsheet	54
Volksmodem 12 (1200/300)	209	Fleet System 2	65
Total Comm. Auto Modem	69	**MIRAGE CONCEPTS**	
MPP 1064 w/VIP Term	72	Data Base Mgr. w/Report	71
C-64 Power Supply 1-yr	34	W.P. Prof. Version	63
Omnitronix Deluxe RS-232	35	W.P. Personal Version	33
Graphic Printer Intrfce	30	**SKYLES ELECTRIC**	
ACCESS SOFTWARE		"1541 Flash" Disk Drive Speed-Up w/Switch	75
Beach Head	24	Blitz (Compiler)	75
Raid Over Moscow	24	**SUBLOGIC**	
COMPUSERVE		Flight Simulator II	37
Starter Kit (5 hr)	23	**XETEC**	
Vidtex	28	Fontmaster Wordprocessor	29
KOALA		**GRAPHICS**	
Koala Pad	58	Doodle	28
Koala Printer	17	Inkwell's Flexidraw	129
PRECISION SOFTWARE		Peripheral Vision w/Pen	39
Superbase	47	Print Shop	29
BATTERIES INC.		**EPYX**	
Paper Clip w/Spellpack	79	Fast Load (Cart)	26
The Consultant	68	**UTILITIES**	
Home Pak	34	CSM Drive Alignment	32
Home Organizer Series (EA)	15	Auto Load w/Reset (Cart)	15
MISC.		Super Clone	39
Smart 64 Term	29	Ultrabyte Disk Nibbler	29
Telstar 64 Term (Cart)	25		

2726 PARK ST., JACKSONVILLE, FL 32205

Orders with cashiers check, money order and VISA/MC shipped promptly • For personal/company checks allow 3 weeks for clearance • No CODs • For VISA/MC add 3% • Shipping charges extra, $3.00 minimum • Prices may differ in AA stores • Florida residents add 5% tax • Prices subject to change without notice.

WIZARD

THE MIRROR

WIZARD

DISK COPIER

$24.95

NO FINER OR MORE ADVANCED ARCHIVAL COPIER AVAILABLE AT ANY PRICE.

EASY TO USE.

AUTOMATICALLY MAKES BACK-UP COPIES FROM VIRTUALLY ALL PROTECTED SOFTWARE.

NIBBLES, HALF TRACKS, COPIES EXTRA SECTORS AND EXTRA TRACKS.

REPRODUCES ALL DISK ERRORS AUTOMATICALLY.

FAST, COPIES FULL DISK IN AS LITTLE AS 4-7 MINS. EVEN COPIES ITSELF.

MASTERCARD, VISA, M.O. OR CHECK OK.
+ $3 SHIPPING & HANDLING
C.O.D. OR FOREIGN ORDERS ADD $2
CALIF. ORDERS ADD 6% SALES TAX
—WRITE OR CALL—

COMPUMED

(408)-758-2436

VISA P O BOX 6427 M/C

SALINAS, CA 93912

FOR COMMODORE 64 AND 1541 DRIVE

FAST DELIVERY

Call Us For
Fast Service, Experience
and Affordable Prices

Software

SPRING SPECIAL

SUBLOGIC
Flight Simulator
$31.95
MICROPROSE
F-15 EAGLE
$21.95

MICROLEAGUE
Baseball.....29.95

FAST LOAD
$24

WORD PROCESSING

Special of the Month
FLEET SYSTEM 2
Great Buy $55

REPEAT OF A SELLOUT
Paper Clip with Speller
$60

PROGRAMMING SERIES

Simon Basic $27
Borland Pascal $42
Nevada Fortran $39

ACCOUNTING

Home Accountant $44
Tax Advantage $45
General Ledger $35
A/R, A/P, Payroll $35
The Manager $35

DATA BASES

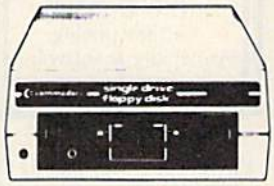
Mirage Database Mgr. $79
Super Base 64 ..... $54

Special of the Month
The Consultant
$57

SPREAD SHEET

Multiplan $63
Practicalc $38

Hardware



1541 $189

Special of the Month
MSD DISK DRIVE
SD1 Disk Drive $244
SD2 Disk Drive $444

Introductory Offer
INDUS GT
DISK DRIVE
$269

ELEPHANT DISK
SS/SD $15.50 SS/DD $16.50

Special of the Month
LORAN SS/DD
$12.95 Box of 10

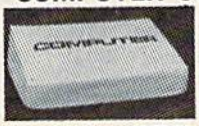
NEW.....FAST
1660 MODEM
$59

SX-64 Computer $459
MPS 802 ..... $214
1530 Datasette $59
Magic Voice Speech $49.95
1011 RS 232 Interface..... $49

1702 Monitor
$189

ZENITH MONITORS
122 Amber $84
123 Green $84

COMPUTER COVERS



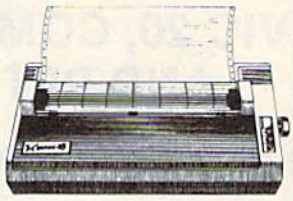
Features heavy duty canvas with vinyl interior waterproof

Reg. $15.95
$6.99

CMD 64 ..... $6.99
VIC 20 ..... $6.99
Disk Drive..... $6.99
Espon MX 80 ..... $7.99
Espon MX 80 FT $7.99
Okidata 92 ..... $7.99

Printers

GEMINI 10X
$219



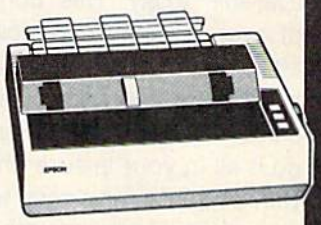
15X $339

Number one selling dot matrix printer, Gemini 10X, prints 120 cps bi-directionally, with logic-seeking printerhead control. There's both friction and tractor paper feed. Prints high resolution graphics.

Letter Quality Powertype $325

NEW SG-10, SG-15, SR-10, SR-15 IN STOCK, CALL FOR PRICES

EPSON RX80
$219



LX80 ..... $249

Dot matrix printer with NLQ mode, prints 100 cps, bi-directionally. Call for RX-100, FX-80 and FX-100 prices.

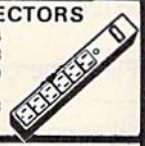
Special Offer
MW-350 ..... $69
4K Buffer $29

Digital Devices
U Print Interface $59
16K Printer Buffer .. $99
64K Printer Buffer $169
Epson 80 Ribbon $5

Okidata 182..... $239
Okidata 192..... Call
Okidata 93..... $579
Okidata 84..... $649
Okidata Ribbons $3
Juki 6100 ..... $389
Silver Reed 400 ... $249
Silver Reed 500 ... $379

PRINTER INTERFACES
Micrografix MW350 ..... $69
Tymac Connection $79
Cardco + G Interface $49
Cardco B Interface $39
Grappler CD $102

SURGE PROTECTORS
1 Outlet $14
4 Outlet $38
6 Outlet $69
6 Outlet & Noise Filter $88



Ordering & Payment Policy

Prices reflect a cash discount. For Visa, and Mastercard add 3% Immediate delivery with certified check or wired funds. N.J. resident add 6%. Prices subject to change.

USA SHIPPING

For shipping and handling add 4% ($4 minimum)
Larger shipments require additional charge. C.O.D. add $3.50

PANASONIC
1090 ..... $209
1091 ..... $269
1092 ..... $Call

Printer Specials
Doodle..... $26
Print Shop..... $29
Paper 1000 sheets $19.95
Paper 2500 sheets $34.95

FOR INFORMATION CALL (609) 596-1944 MON.-FRI. 10-5

ORDER TOLL FREE (800) 992-3300 MON.-FRI. 9-8 SAT. 10-6, SUN. 12-5

PC GALLERY
P.O. Box 3354
Cherry Hill, N.J. 08034

ATTENTION

ALL COMMODORE 64, VIC 20, COMMODORE 16, AND PET OWNERS

A complete self-tutoring BASIC programming course is now available. This course starts with turning your computer on, to programming just about anything you want! This course is currently used in both High School and Adult Evening Education classes and has also formed the basis of teacher literacy programs. Written by a teacher, who after having taught the course several times, has put together one of the finest programming courses available today. This complete 14 lesson course of over 230 pages is now available for the COMMODORE 64, VIC 20, COMMODORE 16 and PET computers and takes you step by step through a discovery approach to programming and you can do it all in your leisure time! The lessons are filled with examples and easy to understand explanations as well as many programs for you to make up. At the end of each lesson is a test of the information presented. Furthermore, ALL answers are supplied to all the questions and programs, including the answers to the tests. Follow this course step by step, lesson by lesson, and turn yourself into a real programmer! You won't be disappointed!

We will send this COMPLETE course to you at once for just $19.95 plus $3.00 for shipping and handling (U.S. residents, please pay in U.S. funds). If you are not COMPLETELY satisfied, then simply return the course within 10 days of receipt for a FULL refund.

Fill in the coupon or send a facsimile.

CG

NAME:_____

ADDRESS:_____

CITY:_____

PROV./STATE:_____

POSTAL/ZIP CODE:_____

Check desired course:

COMMODORE 64 ☐
VIC ☐ PET ☐
COMMODORE 16 ☐

Send Cheque or Money Order to:
Brantford Educational Services
68 Winding Way,
Brantford, Ontario,
Canada, N3R 3S3

Complete course: $19.95
Postage and hand.: $3.00
Total: $22.95

We'll Have the New Advanced Commodore Products 1st!!

NEW PRODUCTS! LOW PRICES!

Call for information on new products . . .

CATALOGS: Free on written request.

NEED REPAIRS? We are an authorized Commodore Repair Center!!!

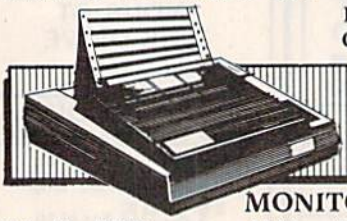
PRINTERS

Powertype Daisywheel 18 CPS with Cardco B	$354	**Epson RX 80** with Tymac Connection	$299
Okidata 92 160 CPS with Tymac Connection	429	**DPS 1101** Daisywheel Direct Connect to C64	Call
Commodore MPS 802	Call	**Riteman C+** NEW	Call
Okidata 182 NEW	Call	**MW-350 Interface** NEW	Call

SPECIAL • **PRINT SHOP** . . . . . $32.00 • *SPECIAL*

DISK DRIVES

MSD Super Drive	Call	**Commodore 1541**	Call
Indus GT	Call	**Phonemark Datasette**	$29
		Epyx Fast Load	$27
		Commodore 1571/72	Call



MONITORS

Teknika MJ10	$189	**Zenith ZVM** Gr/Amb	$89/99
Commodore 1702	Call	**Commodore 1902**	Call

DATABASE MANGERS

The Consultant	$59	**PFS:File**	$59
Super Base 64	49	**PFS:Report**	49
The Manager	35		

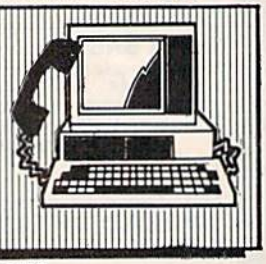
WORD PROCESSORS

Paper Clip/& speller	$55/69	**Easy Script**	$35
Fleet System 2 NEW	Call	**Easy Spell**	17

ACCOUNTING

Peachtree GL/AP/AR	$139
Commodore GL/AP/AR/PR/INV *ea.*	34

COMPUSERVE STARTER KIT & VIDTEX . . . . Both for **39.95**



MODEMS

Westridge 6420	Call
Mighty Mo	Call
Volksmodem 12 1200 Baud!	Call
VIP Terminal	$29
Commodore 1660	59

ACCESSORIES

Com Cool Drive Fan	$49	**Power Pak**	$27
Com Cool Plus w/ surge	69	**Surge Protector** 4-Plug	25

BLACK NAUGAHYDE COVERS

C-64 or 1541 Drive	ea. $5	**1702 Monitor**	$10
MSD Drives 1/2	5/6	**1525/MPS 801**	7
Gemini 10X	9	**1526/MPS 802**	8

MOST ORDERS SHIPPED WITHIN 48 HOURS! Advertised prices are for bank check or money order. VISA/MC orders add 3.5%. NO C.O.D ORDERS. Personal or company checks delay orders 21 days. All sales are final – defective merchandise exchanged for same product only. Add 3% for shipping ($2.50 min.) Please call for shipping on monitors. Ohio residents add 5.5% sales tax. Prices & availability subject to change.

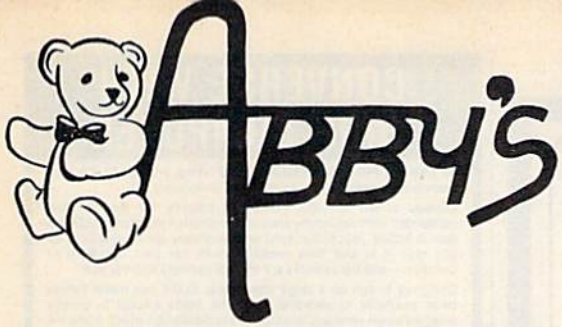
HOURS: MON-FRI 10 AM to 10 PM • SAT 10 AM to 5 PM • SUN Noon to 5 PM

800-638-2617

INFORMATION & IN OHIO 216/758-0009

BIG BYTES

1301 BOARDMAN-POLAND ROAD POLAND, OHIO 44514



DISCOUNT SOFTWARE

ABBY'S CARRIES A FULL SELECTION OF SOFTWARE FOR YOUR COMMODORE COMPUTER. CALL FOR CURRENT PRICES. ASK FOR FREE CATALOG.

— SPECIAL — SUPER ABBY'S SOFTWARE BUYS

Atarisoft VIC-20 (ROM) ..... $3 Each
Pac-Man, Donkey Kong, Centipede

ATARISOFT C-64 (ROM) ..... $10 Each
Pac-Man, Robotron, Defender, Jungle Hunt, Centipede

SPINNAKER (ROM) ..... $19 Each

FOR COMMODORE
Adventure Creator, Aegean Voyage, Alf in the Color Caves, Alphabet Zoo, Bubble Burst, Delta Drawing, Facemaker, Fraction Fever, Jukebox, Kids on Keys, Kindercomp, Up For Grabs

FOR ATARI
Alphabet Zoo, Delta Drawing, Facemaker, Fraction Fever, Kinder Comp, Up For Grabs

FISHER PRICE (ROM) ..... $16 Each

FOR BOTH ATARI & COMMODORE
Dance Fantasy, Memory Manor, Linking Logic, Logic Levels

FOR COMMODORE ONLY
Alpha Build, Hop Along Counting, Up & Add 'Em, Sea Speller, Number Tumbler

ABACUS

Pascal	$34
Chartpak	$34
Ada	CALL
Fortran	CALL
C-Basic	CALL

CBS

Felony	$27
Murder By Dozen	$27
Success With Math Series	Each $21

ELECTRONIC ARTS

7 Cities of Gold	$29
Adv. Construction Kit	$37
Archon	$29
Archon II	$29
Financial Cookbook	$37
One On One	$29
Pinball Construction	$29
Standing Stones	$29
Murder/Zinderneuf	$29

MICROPROSE

Air Rescue I	$27
F-15 Strike Eagle	$29
Kennedy Approach	$27
NATO Commander	$27
Decision In The Desert	$29
Crusade	$29

EPYX

Fast Load (R)	$29
Summer Games II	$29
Ball Blazer	$29
Rescue on Fraculus	$29
Robots of Dawn	$29
Right Stuff	$29

INFOCOM

Deadline	$35
Enchanter	$27
Hitch Hiker	$27
Infidel	$29
Sorcerer	$29
Witness	$27
Invisaclues	each $7

SSI

Kampforuppe	$49
Field of Fire	$29
Operation Market Garden	$37
Computer Quarterback	$29
Battle for Normandy	$29
Broadsides	$29
Rails West	$29
Computer Baseball	$29
Baltic 85	$27
Combat Leader	$29
Gemstone Warrior	$27

SIGHT & SOUND

Incredible Music Keyboard	$35
Kawasaki Synthesizer	$36
Kawasaki Rhythm Rocker	$29
Music Processor	$26
3001 Sound Odyssey	$29
Computer Song Albums	$26
Time Trivia	$26
Music Video Kit	$29

TOP HITS

Fleet System	$69
Bank St Writer	$59
Mirage	$79
Paperclip/Speller	$89
Homepak	$37
B/Graph	$51
Cave of the Word Wizards	$24
Beachhead II	$29
CSM 1541 Disk Alignment	$44
Print Shop	$34
Indiana Jones	$24
Bank St. Musicwriter	$39
Home Accountant	$59
Net Worth	$71
Adv. Writer	$32
Code Writer	$69
Super Base	$65
Ghostbusters	$25
Star League Baseball	$25
Star League Football	$25
Doodle	$29
Vidtex	$32
Compuserve	$27
Major League Baseball	$31
Team Disk (for above)	$16
Movie Maker	$39
Master Type (R)	$29
Spy Hunter (R)	$35
Tapper (R)	$35
Flight Sim. II (D or C)	$39
Mr. Nibble	$34
Mach 5	$32

HARDWARE

1670 Modem	$199
C-128 Modem	$279
1571 Modem	$259
1572 Modem	$399
1902 Modem	$279
Okimate 10 W/Interface	$199
Complete Line of Epson Printers and Star Printers Starting at	$149

ACCESSORIES & BOOKS

Print Shop Paper Refill	$13
Disk Notcher	$ 6
Ribbon Cartridge For Okimate 10	$ 6
All Abacus & Compute Books	CALL
128 K Upgrade for C-128	CALL
256 K Upgrade for C-128	CALL
384 K Upgrade for C-128	CALL
Covers for All Computers & Accessories	$8 & Up
Cardco +G	$75
Koala Pad	$69
Bulk Disks, SSDD	$1 per Disk
(If Bought By 100's)	(Elephant or Nishua)

ALL TITLES ON DISK UNLESS MARKED (R) FOR ROM CARTRIDGE

Order Line
1-800-282-0333
ORDERS ONLY! Sales Personnel Do Not Have Information on Previous Orders or Product Specs.

M-F 10 a.m.-7 p.m.; Sat. 10-3 ET

37 S. Broad Street, Fairborn, OH 45324

Customer Service
1-513-879-9699

AD #G-65

Prepaid orders over $50 receive free shipping, UPS, continental US. No waiting period when paid by credit card, certified check or money order. Add $2 shipping and handling on orders under $50. Add $5 for COD orders. $15 Minimum for VISA/MC. Hardware requires additional freight charges. Ohio residents add 5.5% sales tax. All items subject to availability and price change.

PLEASE CITE AD NUMBER WHEN ORDERING.

THE BANNER MACHINE™ for the Commodore 64

Makes signs up to 10" tall by any length.
Borders are variable, up to ¾" wide.
Eight sizes of letters are available from ⅜" to 6½" high.
Proportional spacing, automatic centering, right and left justification.
Standard, emphasized and compressed modes of print.
Save and print banners from disk.
Format banner and review before printing.
Choice of 15 textured backgrounds.
Included FONT DISK 2 optional FONT DISKS

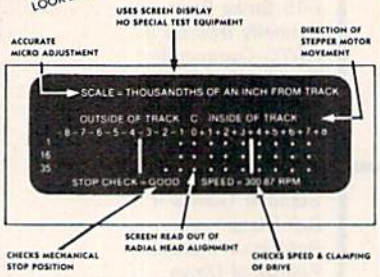
Works only with: Epson MX 80 (with Graftrax), RX, FX, JX, LQ; Gemini 10, 10X and 15; Commodore MPS 801, 1525[;] Banana; Panasonic P1090; Seikosha GP100A; Riteman II, Plus, 15, Mannesmann Talley, Spirit 80, Okidata 82A, 83A with Okigraph, 92A and 93A, Prowriter 8510, C. Itoh 8510.

THE BANNER MACHINE	**$49.95**	**Available on DISK only.**
FONT DISKS (optional) each	**$39.95**	

See reviews in: Midnight Gazette #21, 1984 p. 49; RUN, Jan. 1985 p. 122; Ahoy! Magazine April 1985 p. 32

1541 PHYSICAL EXAM $39.95

IS YOUR 1541 HEALTHY? OR WOULD ITS PHYSICAL EXAM LOOK LIKE THIS ONE?



Package includes:
- True digital alignment disk with offset tracks
- Quiet Drive stops to reduce need for continued realignment on old style drives.

ditto
COPY DISKS AUTOMATICALLY
$39.95

- Copies 99% of currently available Commodore 64 disks.
- Supports 1 or 2 1541 drives.
- Easy to use—menu driven.

FLEX FILE $59.95
DATA BASE
with Report Writer and Mail Labels

• Easy to learn (takes about 2 hours) • save up to 1500 typical records on a 1541 disk drive • Sort on multiple keys & select records 9 ways • Print information on labels or in report format • Calculate report columns. • Flexible structure, change record size, field number, ways the file can be ordered, etc. with ease. • Compatible with many popular word processors to create form letters or reports. 1541 • 4040 • 9031 Disk $59.95

ORDER TOLL FREE 10-6 MON.-SAT.
800-762-5645
13646 Jefferson Davis Hwy., Woodbridge VA 22191, Info. call (703) 491-6502
In Canada ARPIN MICRO
1983 Pharmacy Ave.
Scarborough
Ontario M1R 2J1
(416) 443-0843

Cardinal Software

CONVERSE WITH YOUR COMPUTER

AT LAST! A FULL IMPLEMENTATION of the original ELIZA program is now available to run on your Commodore 64!

Created at MIT in 1966, ELIZA has become the world's most celebrated artificial intelligence demonstration program. ELIZA is a non-directive psychotherapist who analyzes each statement as you type it in and then responds with her own comment or question—and her remarks are often amazingly appropriate!

Designed to run on a large mainframe, ELIZA has never before been available to personal computer users except in greatly stripped down versions lacking the sophistication which made the original program so fascinating.

Now, our new Commodore 64 version possessing the **FULL** power and range of expression of the original is being offered at the introductory price of only $25. And if you want to find out how she does it (or teach her to do more) we will include the complete **SOURCE PROGRAM** for only $20 additional.

Order your copy of ELIZA today and you'll never again wonder how to respond when you hear someone say, "Okay, let's see what this computer of yours can actually do!"

READ WHAT THE EXPERTS SAY ABOUT OUR VERSION OF ELIZA:

"Much more than a mere game...You'll be impressed with ELIZA...A convincing demonstration of Artificial Intelligence." —*PC MAGAZINE*

"Delightful entertainment...An ideal medium for showing off your system." —*MICROCOMPUTING MAGAZINE*

"ELIZA is an astounding piece of software...A fascinating program to use and study." —*BARON'S MICROCOMPUTER REPORTS*

"ELIZA is a great way to introduce your friends to computers...A very funny party game." —*PETER A. McWILLIAMS*

"ELIZA is an exceptional program, one that's fun to use, shows off your machine, and has great historical interest." —*POPULAR COMPUTING MAGAZINE*

"This version of ELIZA is the best we have seen. As a party game, it is unmatched." —*HOME APPLICATIONS FOR THE C-64*

ELIZA IS AVAILABLE IN THE FOLLOWING FORMATS:
(Please specify Disk or Cassette)

1. Protected Version $25
(Protected Version can be run but not listed or modified)
2. Un-protected Commodore 64 BASIC Source Version $45
(Source Version can be listed and modified as well as run)

Both versions include a six page user manual.

Please add $2.00 shipping and handling to all orders
(California residents please add 6½% sales tax)

ARTIFICIAL INTELLIGENCE RESEARCH GROUP
921 North La Jolla Avenue, Dept. G
Los Angeles, CA 90046
(213) 656-7368 (213) 654-2214
MC, VISA and checks accepted

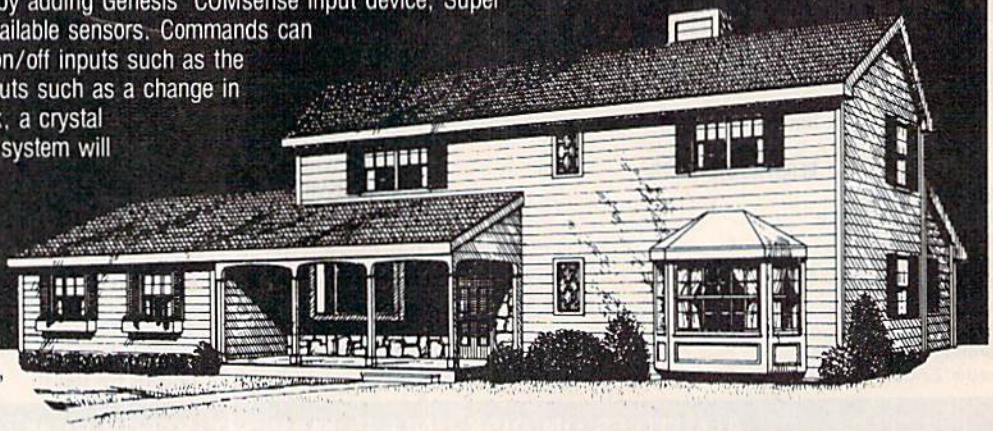
Make Your Home Secure and Energywise

. . . with Genesis Home Control Products

At Genesis Computer we produce a complete line of home security and energy management products. They combine with your Commodore 64 to make your home safer and more energy efficient while increasing your personal convenience.

The Genesis VIController allows you to control up to 256 lights and appliances throughout your home using standard BSR receiver modules. With the included software, you can create daily and weekly control schedules.

Your system can be expanded by adding Genesis' COMsense input device, Super Schedule Plus software, and available sensors. Commands can then be issued in response to on/off inputs such as the opening of a door or analog inputs such as a change in light level. By adding COMclock, a crystal controlled clock/calendar, your system will have an accurate, battery backed-up time base. COMclock's Autoboot ROM acts as a failsafe restart for the system in the event of a power failure.



Sold separately the VIController, COMsense and COMclock sell for $69.95 each and the Super Schedule Plus software sells for $19.95. All four products are available together in our HOME CONTROL PACKAGE for only $199.95.

Call 215-861-0850 to order direct or contact your local dealer.

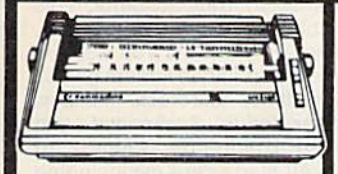
Genesis Computer Corp. • P.O. Box 152 • Hellertown, PA 18055

Illustration courtesy of Homes for Living. 107-40 Queens Blvd., Forest Hills, NY 11375. Architect Samuel Paul, A.I.A.

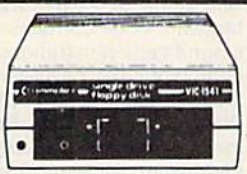
COMPUTER CENTERS OF AMERICA

CALL TOLL FREE
1-800-631-1003

UNBELIEVABLE PRICES! (BELOW WHOLESALE)



commodore
1101 LETTER QUALITY PRINTER
274.95



commodore
VIC 1541 DISC DRIVE
169.95

NEW commodore 128 Coming Soon **279.95**

COMMODORE 64
144.95

FREE Dustcover for Commodore 64 with any Hardware Purchase

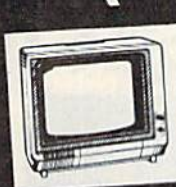
commodore
1702 MONITOR
174.95

CARDCO PRODUCTS IN STOCK & ON SALE!

Indus GT Disc Drive
249.95

NEW MSD Super Disc II Now On Sale
449.95
Single Drive . . 249.95

WICO JOYSTICKS
THE BOSS 12.88
The Bat 14.88
3-Way 19.88

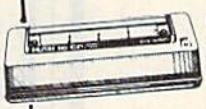


Monitors
BMC Color . 149.95
Pan 1300 RGB & Comp. 289.95
Zenith Green 79.95

Modems
Comm 1660 . . . . . 84.95
Mighty Mo . . . . . Call
Telesonic . . . . . Call
Hes II . . . . . Call

Cassette Recorders
Comm CN-2 . . . . 59.95
Third Party 39.95

Printers



Gemini SG 10 . . . . 209.95
Gemini SD 10/15 New! . . Call
Gemini SR 10/15 New! . . Call
Gemini SB 10 New! . . . . . Call
Gemini SG 15 . . . . . 359.95
Silver Reed 400 . . . . 249.95
Panasonic 1091 . . . . . Call

Hush 80 CD
Smaller, Quieter 89.95

Interfaces

Telesys Turboprint GT
•Prints Enhanced Graphics, 4 Different Type Faces, & Reverse Characters •Includes Power Cord, Five Feet of Cable and All Required Connectors **59.95**

Cardco G + ... Call
Microworld . . . . . Call

Diskettes

Nashua 10.95
Scotch 14.95
Maxell 14.95
Memorex 13.95

commodore
NEW PRODUCTS

801 MCS Color Printer **269.95**

C-16 Computer **79.95**
C+4 Computer **189.95**
801 Printer **149.95**
802 Printer **179.95**
803 Printer **174.95**

SOFTWARE SPECIALS

Fisher-Price Learning Software

Alpha Build	12.99
Logic Levels	12.99
Movie Creator	12.99
Sea Speller	12.99
Songmaker	12.99
Up & Add 'Em	14.99

Windsor Classics By Fisher Price

Below The Root	16.99
Swiss Family Robinson	16.99
Alice in Wonderland	16.99
Treasure Island	16.99
Robin Hood	16.99
Wizard of Oz	16.99

penguin software

Quest	19.99
Transylvania	19.99
Sword of Kadash	19.99
Xyphus	19.99
Graphics Magician Picture Painter	21.99

Spinnaker

Counting Parade	16.99
Early Learning Friends	16.99
Math Buster	16.99
President's Choice	23.99
Sum Ducks	16.99
Amazon	19.99
Dragonworld	19.99
Fahrenheit 451	19.99
Rendezvous with Rama	19.99

Professional Software

Fleet System 2—Word Processor with built-in 70,000 word spell check	59.95

CBS Software

Dr. Seuss Fix up The Mix-up Puzzler	19.99
Sesame Street Letter-Go-Round	19.99
Big Bird's Fun House	19.99
The Sea Voyager	24.99
Weather Tamers	12.99
Movie Musical Madness	9.99
Success w/Decimals (Add/Subt) D-T	14.99
Success w/Decimals (Mult/Div) D-T	14.99
Success w/Fractions (Add/Subt) D-T	14.99
Success w/Fractions (Mult/Div) D-T	14.99
Duck's Ahoy	23.99
Ernie's Magic Shapes	23.99
Mastering The SAT	104.99
Murder by the Dozen	23.99
Peanut Butter Panic	24.99

Epyx

Fast Load	24.99
Barbie	19.99
Hot Wheels	19.99
G. I. Joe	19.99
Breakdance	19.99
Baseball	19.99
Pitstop	24.99
Pitstop II	24.99
9 to 5 Typing	24.99
Moreta	24.99

Touch Tablets

Koala Touch Tablet-D	64.95
Koala Touch Tablet-Cart	69.95
Muppet Learning Keys	Call

Access

Neutral Zone-D/T	20.95
Spritemaster-D/T	20.95
Beachhead-D/T	20.95
Master Composer-D	23.95

Commodore

Program Ref. Guide	19.95
Assembler-D	17.95
Easy Finance I, II, III, IV,-D	19.95
Easy Calc-D	64.95
Easy Mail-D	17.95
Easy Script-D	39.95
Easy Spell-D	19.95
Logo-D	49.95
The Manager-D	37.95
General Ledger-D	37.95
Accts. Rec.-D	37.95
Accts. Pay-D	37.95
Magic Desk-D	52.95
Zork I, II or III-D	29.95
Suspended-D	29.95
Starcross-D	29.95
Deadline-D	29.95

TO ORDER: CALL TOLL FREE—WE'RE PROUD OF OUR PRICES-SATISFACTION GUARANTEED

IN NEW YORK STATE CALL TOLL FREE 1-800-221-2760 OR 516-249-2120

1-800-631-1003

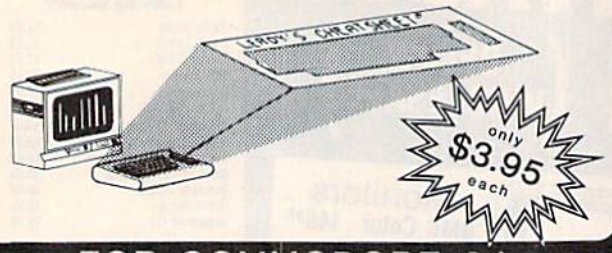
We're Reliable! 18 years of service.

Check, Money Order, MC or VISA accepted/No additional charge for MasterCard and Visa/Call for shipping and handling information/NYS residents add applicable sales tax/Prices and availability are subject to change without notice/All factory fresh merchandise with manufacturer's warranty. Dealers Welcome. Call for recent price reductions and new rebate information. Plus shipping and handling.

or Write
Computer Centers of America
81 Terminal Dr.
Plainview, NY 11803

LEROY'S CHEATSHEET®

KEYBOARD OVERLAYS



FOR COMMODORE 64

(VIC-20 also available)

LEROY'S CHEATSHEETS® are plastic laminated keyboard overlays designed for use with popular software and hardware for Commodore's VIC-20 & C-64 computers.

These cut-it-out yourself overlays are designed to fit over the keyboard surrounding the keys with commands and controls grouped together for easy references.

LEROY'S CHEATSHEETS™

make life easier for you

WORD PROCESSORS
- ☐ Easy Script
- ☐ HES Writer
- ☐ Paper Clip
- ☐ Quick Brown Fox
- ☐ Script 64
- ☐ Speedscript (GAZETTE)
- ☐ Wordpro 3/PLUS
- ☐ Omniwriter
- ☐ Wordpro 64 (By Steve Punter)

SPREADSHEETS
- ☐ Calc Result (advanced)
- ☐ Calc Result (easy)
- ☐ Easy Calc
- ☐ Multiplan
- ☐ PractiCalc 64 (or PLUS)

DATA BASES
- ☐ The Consultant (Delphi's Oracle)
- ☐ The Manager (CBM)
- ☐ SuperBase 64

PRINTERS
- ☐ Printer (CBM) 1525, MPS 801, MPS 803
- ☐ Printer (CBM) 1526, MPS 802
- ☐ Printer (Epson) RX-80
- ☐ Printer (Gemini) 10X
- ☐ Printer Okidata 92 & 93

gaz 6

MISCELLANEOUS
- ☐ Blanks (3 each - NOT Laminated)
- ☐ For The Beginner (using the 64)
- ☐ Sprites Only
- ☐ Flight Simulator II
- ☐ Doodle
- ☐ 1541 Disk

LANGUAGES & UTILITIES
- ☐ COMAL
- ☐ SIMON'S BASIC
- ☐ Basic
- ☐ Hesmon 64
- ☐ LOGO (sheet 1)
- ☐ LOGO (sheet 2)
- ☐ Pilot (CBM)

TERMINALS
- ☐ Vidtex
- ☐ The Smart 64 Terminal
- ☐ VIP Terminal
- ☐ Term 64

Qty.___ X $3.95 $_____

Shipping & handling $ 1.00

6% sales tax (PA residents only) $_____

TOTAL $_____

U.S. FUNDS

NO COD's PLEASE

Dealer inquiries welcome

Name _____

Address _____

City _____ State _____ Zip _____

(1) Products of Commodore Business Machines

CHEATSHEET PRODUCTS™

P.O. Box 111368 Pittsburgh PA. 15238

VISA master charge

(412) 781-1551

. . . OR SEE YOUR LOCAL DEALER !

ONLY $19.95

(ALMOST) FREE CLUES:

If you've ever been stuck in an adventure game, you need **The Book of Adventure Games** by Kim Schuette. This fantastic book contains complete legible (typeset) maps, magnificent illustrations, and all the hints you need to complete 77 of the all-time most popular adventure games including **Zork I, II, III, Deadline, Starcross, Witness, Planetfall, Enchanter, Sorcerer, Infidel, Suspended (with map), Wizardry, Knight of Diamonds, Legacy of Llylgamyn, All Scott Adams, All Sierra On-Line** including **Time Zone, Ultima I, II, III** and many more! Best of all, the book doesn't spoil your fun! At about 25¢ an adventure, it's the biggest bargain around. So stop getting ripped off by $10 cluebooks and call:

1-(800)-821-5226 Ext. 500

24 hrs. a day, 7 days a week

or write:

Witt's End

42 Morehouse Rd., Dept.13

Easton, CT 06612

Free UPS shipping. Add $3.00 for C.O.D. APO's FPO's o.k. Add $5.00 for foreign shipping. No charge for credit cards. We accept Visa/Mastercard, Personal Check (allow 2 weeks to clear), Certified Check or money order.

All Trademarks are acknowledged.

MasterCard VISA

IT'S LIKE DISKETTES FOR 99¢ EACH!

21™ diskettes

- 100% more capacity than Single Side Diskettes
- For use in ANY 5¼ Disk Drive
- Just turn it over to use the other side
- Both sides are certified 100% Error Free
- 5 Year Guarantee

• MADE IN U.S.A. • TOTAL SEAM BONDING
• TYVEK JACKETS, REINFORCED HUB RINGS
• EXCEEDS INDUSTRY TECHNICAL SPECIFICATIONS

only **$19.80*** for 10 disks (20 sides) call for quantity discounts

ORDER TODAY

MasterCard VISA

*On all orders add $2. for postage & handling ($5 Foreign). Florida res. add 5% Sales Tax.

SATISFACTION GUARANTEED OR YOUR MONEY BACK!

TOLL FREE 1-800-642-2536

FLORIDA 305-493-8355

or send check or money order to:

nibble notch®

computer products

4211 NW 75th Terrace • Dept. 14 2 Lauderhill, FL 33319

NEW LOW PRICES FROM THE WORLD'S LARGEST SPORTS SOFTWARE COMPANY!

Whether you're a coach, player, computer bug, statistician, dabbler, doer or just a real sports fan, PDS has a package for you...at our lowest prices ever! Check our line-up below, and then order your first PDS Sports Package.

FOOTBALL STATISTICS. A comprehensive computer software system. You compare teams in over 60 offensive and defensive situations and watch the matchups on the screen. Every team is given a power rating. PDS also provides "year-to-date" data diskettes for a nominal charge. 39.95

FOOTBALL HANDICAPPING. (Includes FOOTBALL STATISTICS Package). Forecasts the outcome of football games based on massive amounts of statistical data, morning lines and point spreads. 49.95

BASKETBALL STATISTICS. The most comprehensive basketball program ever written. "What-if" your way into every imaginable comparison and formulation. 39.95

BASKETBALL HANDICAPPING. (Includes BASKETBALL STATISTICS). Gives you an inside look into the outcome of games by mathematically equating statistics, lines and point spreads. 49.95

BASEBALL STATISTICS. See how opposing baseball teams stack up against each other. See summarizations. Performance stats on every team in the major leagues. 39.95

BASEBALL HANDICAPPING. (Includes BASEBALL STATISTICS) Makes you better-prepared to predict the winner of any game. At least, mathematically. 49.95

THOROUGHBRED HANDICAPPING. This "world class" program gives you an edge in predicting winners. A proven system...by PDS and many horseracing enthusiasts. 129.00

HARNESS RACE HANDICAPPING. The fast, easy way to find out what races and what horses should be looked at...all summarized in a "power rating" format. 129.00

QUARTER HORSE HANDICAPPING. the computer system actually "rates" the horses in each race of what is the fastest growing segment in the sport of kings. 129.00

TRAINER STATISTICS. Analyzes all local racehorse trainers and gives you a rating for each one. 39.95

JOCKEY STATISTICS. A short time with this software package will show you why the top 15 jockeys at local tracks win over 90% of all races. 39.95

HARNESS DRIVER STATISTICS. A complement to the HARNESS HORSE HANDICAPPING System, this package tells you all you need to know about the man (or woman) *behind* the horse. 39.95

PDS SPORTS™

P.O. BOX E / TORRANCE, CA 90507 / (213) 516-6688
Please send me the following PDS SOFTWARE PACKAGE:

_____...$_____
_____...$_____
_____...$_____
Total

Add $6.00 for postage and handling.
Calif. residents add 6½% sales tax
I have an APPLE ( ) IBM ( ) TRS-80 ( )
COMMODORE-64 ( )
DISKETTE ( ) CASSETTE ( ); MODEL # _____
( ) Check enclosed
( ) Charge my credit card: A.E. ( ), VISA ( ), M.C. ( )
Card No._____ Expires_____
Signature_____
(As it appears on credit card)
OR CHARGE BY PHONE...CALL (800) 222-2601
(In Calif: (213) 516-6688)
NAME_____
ADDRESS_____ PHONE_____
CITY_____ STATE____ ZIP_____

Dealer Inquiries Invited

BETTER KEYBOARD UTILITY.

A simply elegant solution—blank "Cheat Sheets" give you the keyboard commands you need, instantly, for any program.

You've got the best personal computer in the world and lots of software to run on it. But unless you work with each of these programs every day, how do you keep the commands straight? "F5" in one program means something else in another. Our solution? Simple. A pack of 12 cards die cut to fit your keyboard. Ready for YOU TO FILL IN. Have all of your program commands right where you want them. . . on your keyboard. Order a couple of packs today.

$12.95 set of 12 custom die cut sheets **$19.95** set of 24 custom die cut sheets

BETTER DUST PROTECTION FOR VIC & COMMODORE

Choose an attractive static-free cover for your keyboard, monitor or complete system.

Don't confuse these attractive covers with cheap static-filled clear plastic covers. These deluxe covers are custom-fitted to each element of your Commodore, and are sewn, not glued. The interior of the supple leather-like material is lined with a special soft fabric liner to prevent scratching. Soft camel color fits beautifully in any office or home. Available: computer cover ($9.95), monitor cover ($12.95), 1541 disk drive cover ($8.95), dataset cover ($7.95). Printer covers (specify type) $12.95.

$7.95 to **$12.95**

We Can Solve All Your Commodore Color Problems

Unique Problem Solvers for Older Commodores (with 5 Pin Monitor Din Plug).

The Interference Stopper. . . A new kit that installs in minutes with two simple solder connections. Best results when combined with items below. Absolutely stops 90% of the RF interference. **$15.95**

The Color Sharpener. . . Use if your "old 64" is hooked up to a TV. Just plug into the monitor plug, and the color and contrast immediately improve. Dramatically crisp letters. Great graphics. **$18.95**

The NEW Color Sharpener CABLE. . . Use if your "old 64" is hooked up to a monitor. A new 2 prong cable, with a Color Sharpener built in for your monitor. **$24.95**

The Monitor "Improver". . . If you have a Commodore 1701 monitor, this cable (3 prong) gives you a picture you won't believe. Better than the cable Commodore built. (Also hooks your "old 64" to the 1702.) **$24.95**

RESET SWITCHES

2 Versions for Every Need

At last, the "needed" switch for Vic-20 and Commodore. Commodore left out a reset switch. Our switches will return control to you every time.

Version 1—Install it Yourself. Requires two simple solder connections, and drill a small hole. Works great. Saves money. A steal at **$9.95**

Version 2—Use in any Commodore Application. A special **buffered** flow-thru version, that plugs in, gives a "Y" connection that provides your computer with another serial port **and** a reset switch. The ultimate in versatility, convenience and simple installation. No soldering. Introductory priced at **$19.95**

Is Your Commodore Disk Drive Hot and Bothered?

Most of them are, you know. They suffer from read and write problems frequently. We've been told that most of these problems occur because the drive has overheated, throwing the head out of alignment.

Our inexpensive muffin fan sits on top of the disk drive and blows cooling air through it.

We went one step further. We built a surge protector into a second fan model.

$79.95 Fan with Surge protector **$54.95** Muffin fan

Order Today!

Please send me the following:
(Please describe fully. Send U.S. funds only.)

Your satisfaction guaranteed or your purchase price refunded.

Qty.	Item	Price
		$
		$
		$
Total for Merchandise		$
Shipping and Handling (foreign orders add $5.00)		$ 2.00
5% State Tax (WI Residents only)		$
TOTAL ENCLOSED		$

Please charge to. ☐ MasterCard ☐ VISA

Number _____

Expires _____

SHIP TO:

Name _____

Address _____

City _____

State/Zip _____

Mail to: Byles & Pieces, Inc. 550 N. 68th St. Wauwatosa, WI 53213/(414) 257-1214

Dealer Inquiries Invited

Wicked Wendy's House of Discounts

The best little discount house in America.

HARDWARE	Sug. List	Wendy's
PRINTERS		
STAR MICRONICS SG-10 PRINTER high speed (120cps) and near letter quality	$299	$249
STAR MICRONICS SD-10 PRINTER 160 cps, friction and tractor feed, 16K buffer	449	369
MODEMS		
MITEY MO 300 baud C-64 automodem including free **Smart 64 Terminal** software and **$15 of CompuServe access time**	119	69
DISK DRIVES		
MSD SYSTEMS INC SD-1 SUPER DISK DRIVE	299	269
80 COLUMN CARDS		
DATA 20 XL-80 80 COLUMN CARTRIDGE with spread-sheet and wordprocessor included	100	84
MONITORS		
XTRON GREEN or AMBER 12" MONITOR hi res	120	89
XTRON COMCOLOR I 14" COMPOSITE COLOR MONITOR with built in speaker and audio amplifier	240	179
SOFTWARE		
6th SENSE by MICROTECHNIC SOLUTIONS INC.—the ultimate home modem program. You control its actions even when you're not at home. THE THINKING TERMINAL	89	68
SMART 64 TERMINAL+4 by MICROTECHNIC SOLUTIONS INC. software for any C-64 modem, allows upload/download, x-modem, VT52/VT100 emulation	40	28
SMART 64 USERS MANUAL, NEW by CDI, makes a sophisticated program easier to use than the original manual	13	8
VORTEX I BULLETIN BOARD SYSTEM for the MITEY MO and all other C-64 modems. Be your own SYSOP! Many features	75	47
HESWARE OMNIWRITER	60	40
GRAPHICS BASIC	30	20
HESGAMES	35	20
CELL DEFENSE	30	20
SUPER ZAXON	30	20
VIZASTAR 64 by SOLID STATE—three in one with spread-sheet, data base and graphics	119	89

WICKED WENDY'S WHOPPING SPECIAL

MITEY MO and VORTEX I BBS $115.00—SAVE $79

ALL ITEMS SHIPPED WITHIN 72 HOURS OR WE PAY SHIPPING! CASHIER'S CHECK, MONEY ORDER, VISA OR M.C. ACCEPTED. SHIPPING AND HANDLING EXTRA. ADD 4% FOR VISA OR M.C. CALIF RESIDENTS ADD 6.5% TAX.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE. PRODUCT SUBJECT TO AVAILABILITY.

TO ORDER CALL

800-WICKED W

Hours M-F 8:00-5:00 PST.

For California residents or customer service call 415-632-1220 or send your order to:

WICKED WENDY'S HOUSE OF DISCOUNTS
24 HAMILTON CT.
PACIFICA, CA 94044

DUST COVERS

★ **CUSTOM MADE TO FIT**
★ **Heavy 32-oz. VINYL ANTI-STATIC**
★ **EXTENDS EQUIPMENT LIFE**
★ **Choice of Colors Lt. Tan or Brown**

COMPUTERS

C-64; VIC-20; C-16; PLUS 4	7.00
ATARI 800XL; 1200XL; 65XE	8.00
ATARI 130XE; 130 ST	13.00
C-128; B-128	13.00
APPLE IIe	13.00
DATASETTE (OLD)	5.00
DATASETTE (NEW, C2N)	5.00

DISK DRIVES

C-1541; C-1571	8.00
MSD S/D; APPLE S/D	8.00
MSD D/D; APPLE D/D UNIT	10.00
INDUS. GT	8.00

PRINTERS

C-1525/MPS801	10.00
C1526/MPS802	13.00
C/MPS 803; C-1520; C-1530	8.00
PANASONIC KX-P1090/91	13.00
PANASONIC KX-P1092/93	16.00
EPSON MX80; RX80; RX80FT	13.00
EPSON FX80; FX80 F/T	13.00
EPSON MX 100; FX 100; RADIX	16.00
GEMINI 10/10X; DELTA 10	13.00
GEMINI 15/15X	16.00
STAR SD-10; SR-10; SG-10	13.00
STAR SR-15	16.00
RITEMAN II	13.00
SEIKOSHA AT100/GP-550CR	13.00
LEGEND 880	13.00
OKIDATA 91/92	13.00
JUKI 6100	16.00
OKIMATE 10	8.00

MONITORS

C-1702/1703; C-1902 RGBI	16.00
SANYO CRT 36 (GREEN)	16.00
ZENITH ZVM 122/123	16.00
ZENITH ZVM 131/133	23.00
TAXAN RGB 2110	16.00
AMDEK COLOR I	19.00
COMREX 5400	14.00
SAKATA SG-1000; SC-100	16.00
BMC COLOR	16.00

VIDEO RECORDERS

FOR MOST RECORDERS (CUT-OUT FOR CLOCK)	13.00

SPECIAL OFFER
6 OUTLET
SURGE SUPPRESSOR
$24.50 + $2.00 Shpg & Hdlg

Order by stating NAME and MODEL and COLOR CHOICE TAN or BROWN.

Enclose check or money order plus $1.50 per item shipping and handling California Res. Include 6.5% Sales Tax.

SPECIAL COVERS WILL BE MADE TO YOUR DIMENSIONED SKETCH. SEND YOUR REQUIREMENTS FOR OUR LOW PRICE QUOTES

Crown Custom Covers
9606 SHELLYFIELD ROAD
DOWNEY, CA 90240
(213) 862-8391

at TUSSEY COMPUTER PRODUCTS*. . .

WE KNOW WHAT YOU WANT!

We take a bite out of prices!

WE VALUE YOUR BUSINESS. IN ORDER TO EARN IT, WE ARE GOING TO GIVE YOU THE THINGS YOU WANT MOST FROM A MAIL ORDER COMPUTER STORE.

1) **Low Prices!** We try to have the lowest prices around. If you do find a lower price, please give us a chance to beat it.

2) **Fast, dependable service** - Our shipping department works hard to get your orders out quickly, usually within one business day.

3) **Straight talk** - We will give you accurate information as to our stocking condition

4) **Personnel who care** - The people at TCP sincerely want you to be happy with the way your order is handled. We all know our jobs depend on having a happy customer.

ORDERS ONLY PLEASE: 800-468-9044

INFORMATION & PA ORDERS: 814-234-2236

PHONE LINES OPEN 10-8 MON-FRI, 10-5 SAT

THE PANASONIC KXP 1091 PRINTER

Near letter quality at the flick of a switch

The 1091 zips along at 120 cps and has a 1k buffer. It also has all the print modes of the Gemini 10X and Epson RX-80, plus a BIG difference. The 1091 has a near letter quality switch. Flip it and you get a super tight 12 by 18 matrix with characters that rival a daisy wheel! The 1091 has both friction and tractor feed.

Our price $279.00

Panasonic KXP 1090 ..... $199.00

(does not have near-letter quality)

SG 10, NLQ Dot Matrix from Star ..... Call

FREE 32 Page Catalog

Commodore 64 is $147.00*

*With the purchase of any printer, disk drive, monitor, or modem

1541 Disk Drive	$195.00
1702 Color Monitor	$195.00
1660 Modem	Call
Plus 4, C-16, others	Call
SX 64	$495.00

PRINTERS

Gemini 10X	$234.00*
SG 15	Call
Powertype, 18 cps, letter quality	$329.00*
Cardco LQ1 letter quality printer	$429.00
Cardco LQ3	$319.00
Epson RX 80	$225.00
Epson Printers	Call
Okidata Printers	Call
Hush 80	$109.00

*Star Micronics printers come with a 1 year warranty!

PRINTER INTERFACES

Xetec GPI	$ 76.99
Xetec SPI/B	$ 59.99
Xetec SPI	$ 43.99
Cardco ?/+G	$ 67.00
Cardco ?/B	$ 44.00
Cardco PS Interface	Call

DATABASES

The Consultant	$ 63.99
Mirage Database Manager/ Report Generator	$ 69.99
Superbase 64(d)	$ 56.99
Data Manager II by Timeworks	$ 32.99
Practifile by MS(d)	$ 37.00

MODEMS

Total Telecom (1650 compatible)	$ 55.00
Commodore 1660 New!	Call
Compuserve starter kit	$ 26.95
Westridge modem	$ 76.95
VIP terminal package by Softlaw	$ 39.95
Vidtex Terminal	$ 30.00
Vidtex plus Compuserve Starter	$ 49.99

WORD PROCESSORS

Word Processor by Proline(d)	$ 39.99
Wordpro 3+/64 w/spellright(d)	$ 59.00
Paperclip(d)	$ 59.00
Paperclip w/spellpack(d)	$ 76.99
Cardco Write Now/64 (cart)	$ 37.00
Mirage Professional W.P.(d)	$ 59.00
Omni Writer/Speller(d)	$ 45.00
Word Writer(d) by Timeworks	$ 32.99
Script 64	$ 39.99

CARDCO

Light pen	$ 29.00
Numeric keypad	$ 35.00
5 slot exp. interface CB/5	$ 58.00
Mail Now/64	$ 32.00
Spell Now	$ 31.99
File Now	$ 27.95
Graph Now	Call

HARDWARE

1541 Express by RTC	$ 73.99
Smart Cable	$ 49.95
BI 80 Batteries Including 80 column card with Basic 4.0 built in	$137.99
BusCard II by Batteries Included	Call

SPREADSHEETS

Calc Result Adv. (d, cart)	$ 67.00
Calc Result Easy (cart)	$ 33.99
P.S. (Prog. Spreadsheet)(d)	$ 49.99
Practicalc 64(d)	$ 36.00
Practicalc 64(t)	$ 34.00

MONITORS

Zenith 12" Amber	$ 97.00
Zenith 12" Green	$ 92.00
Sakata SC 100 Color Monitor	$239.00
Amdek Color 1 Plus	$259.00
Cable for monitors	$ 9.95
1702	Call

UTILITIES

Pal 64 assembler by Proline(d)	$ 39.99
Power 64 Basic by Proline(d)	$ 39.99
Toolbox 64, both Pal 64 and Power 64(d)	$ 69.99
Canada A/M backup program	$ 39.95
Simon's Basic	$ 39.95
CSM 1541 Alignment	$ 32.99

MISCELLANEOUS

Koalpad w/painter(d)	$ 65.00
Spellpro 64(d) by Proline	$ 39.99
Mailpro 64	$ 39.99
Complete Personal Accountant(d)	$ 54.00
The Home Accountant	$ 36.95
Timeworks Inventory, A/P, A/R, Cash Flow Management, General Ledger, Payroll Management	$40.95 each
64 Doctor	$ 24.95
FCM, First Class Mail	$ 36.95
Super Sketch	$ 39.99

DISK DRIVES

MSD SDI	$239.00
MSD SDII	Call
Indus GT Disk Drive	Call
1541	Call

★ NEW PRODUCTS ★

Trio from Softsync, Integrated W.P., Database, Spreadsheet	Call
Homepak from Bat. Incl., Integrated W.P., Database, Telecommunications	Call
Vizastar Int. Spreadsheet, Database, Business Graphics	Call
Epyx Fast Load	Call
Broderbund Print Shop	$ 31.99

Please Note: When we ask you to call for a price it's because prices on those items are volatile, and we want to be sure we can give you the lowest prices we can.

NEW PRINTER FROM STAR!

The SG-10 is an upgrade of the popular Gemini 10X. It runs at 120 CPS, and has all the print modes of the 10X. What makes this printer different is a near letter quality mode at 60 CPS, with a 17 by 11 matrix! With this mode the printer does double duty, eliminating a need for a letter quality printer. It also includes a built in 2k buffer, and a 1 year warranty.

PLEASE CALL FOR OUR LOW PRICE!

BUY A BUNDLE— $AVE A BUNDLE

Order one of these popular packages of products by number for super savings!

Package #5

WORD PROCESSOR 64 and SPELLPRO 64

The word processor and spelling checker from Proline Software

$73.99

Package #6

1541 EXPRESS and the FAST CABLE

Everything you need to speed up your disk drive

$119.99

Package #7

CONSULTANT and PAPERCLIP W/SPELLPACK

These are the popular Database and Word Processor from Batteries Included

$129.99

Package #9

MIRAGE DATABASE/ADVANCED REPORT GENERATOR and MIRAGE PROFESSIONAL WORD PROCESSOR

A powerful package that integrates together

$124.95

Package #10

BI-80 and PAPERCLIP W/SPELLPACK

The 80-column card with the Basic 4.0 built in, and the Paperclip w/spellpack both from Batteries Included. Paperclip works with the 80-column card to give you a powerful word processor.

$209.95

To Order By Mail: Send personal check, money order, or certified check. Allow 2 weeks for personal checks to clear.

Shipping: Software and accessories: add $2.50 per order. COD order: add $6.00 (cod's not accepted on printers, monitors, and disk drives.) Printers: add $10.00. Disk Drives and Monitors add $8.00. Call for other shipping charges. Additional shipping required on APO, FPO, AK, HI, and foreign orders.

Terms: Orders shipped UPS unless noted otherwise. All prices reflect cash discount. Add 3% for Visa and Mastercard. Manufacturer's warranty honored with our invoice and original packaging. PA residents add 6% sales tax. Prices subject to change. All sales final. Defective products replaced or repaired at our discretion.

"DEALER INQUIRIES INVITED"

Other product lines available! Call for prices.

TUSSEY COMPUTER PRODUCTS

*** (formerly Tussey Mountain Software)**

BOX 1006

STATE COLLEGE, PA 16804

FREE 10 DISKETTES OR 20 C-20 CASSETTES

A subscription to the **'Cassette of the Month'** gets you a tape or disk full of 10 **quality Commodore 64 programs** delivered to you by first class mail every month. The documentation included will help you run great **utilities** like 'Word Processor,' and 'Budget Analyzer,' or enjoy great **games** like 'Frogjump' and 'Caterpillar Cave' **FOR AS LITTLE AS 50 CENTS EACH!**

★ **Limited offer** ★ Subscribe for a year on cassette and receive **20 Free C-20 cassettes** or subscribe for a year on disk and receive **10 Free 5¼ single sided double density diskettes!**

PRICES

	TAPE	DISK
1 YR (12 ISSUES)	60.00	75.00
6 MO (6 ISSUES)	35.00	45.00
Single Copies	7.00	9.00

★ We've been in business for over three years! acquiring
★ Over 4000 satisfied color computer owners
★ Commodore 64 required

Mich. Res. add 4%
Overseas ADD $10 to subscription and $1.00 to single issues.

PERSONAL CHECKS WELCOME!

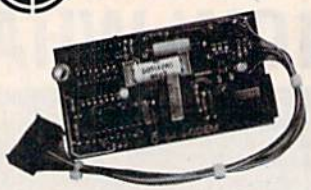
T & D Subscription Software
P.O. BOX 256-C
HOLLAND, MI 49423
(616) 396-7577

---

trans com

TCM-1 MODEM

for the Commodore 64®



TURN YOUR COMPUTER INTO A TELECOMMUNICATIONS SYSTEM!

$109.95 suggested retail price

- Installs INSIDE the computer
- User Port access allowed with modem installed
- Auto Answer/Auto Dial
- Direct connect to phone line
- Software included for uploading and downloading
- Compatible with new C-128 computer

Dealer inquiries invited

Call **1-800-237-3762**, extension 956 (orders only)

trans com, inc.
703-13 ANNORENO DRIVE
ADDISON, IL 60101

Software Discounters of America (& Peripherals, too!)

For Orders Only **1-800-225-7638***
Inquiries and PA 412-361-5291

- Free shipping on orders over $100 in continental USA
- No surcharge for VISA/MASTERCARD

The only telecommunications package you will ever need.

Featuring:

THE INFO CENTER™

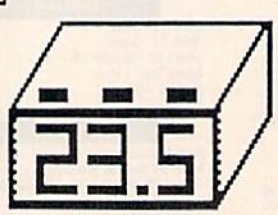
Free Subscription to over 60 Popular Data Bases

• Auto Dial/ Answer Modem

39.95 lowest price ever

For Commodore 64®

***Ordering and Terms:** Orders with cashier check or money order shipped immediately. Personal/company checks, allow 3 weeks clearance. No C.O.D.'s. **Shipping: Continental U.S.A.**—Orders under $100 add $3; **free shipping on orders over $100.** PA residents add 6% sales tax. **AK, HI, FPO-APO**—add $5 on all orders. **International Order Policy**—No Credit Cards—add $15 or 15% of order whichever is greatest. Defective merchandise will be replaced with same merchandise—NO CREDITS! Return must have authorization number (412) 361-5291. Prices subject to change without notice.



.....TRACK MASTER...

TRACK MONITOR FOR COMMODORE DRIVES

- DISPLAY DRIVE HEAD TRACK AND HALF TRACK POSITIONS - TO IDENTIFY ESSENTIAL TRACKS, BAD TRACKS AND LOAD SEQUENCE.
- ELECTRICALLY BYPASS WRITE PROTECT TABS TO USE BACK SIDES OF DISKS WITHOUT NOTCHING.
- ELECTRICALLY WRITE PROTECT YOUR DISK DRIVE.
- MONITOR READING AND WRITING OF TRACK SECTORS DURING OPERATION.
- COMPARE ORIGINAL TRACKS AGAINST COPY TRACKS.
- ONLY $69.95 PLUS $3.50 SHIPPING.

.....MR. COOL.....

COOLING FAN PACKAGE FOR COMMODORE DRIVES

- PACKAGE CONTAINS FAN, FILTER, FINGER GUARD AND POWER CORD.
- NO INSTALLATION NECESSARY - JUST SET ON VENTILATION GRILL.
- EFFECTIVE QUIET COOLING REDUCES HEATING TO ONLY SEVEN DEGREES ABOVE AMBIENT AIR - GREATLY EXTENDING DRIVE SERVICE LIFE.
- ONLY $19.95 PLUS $3.00 SHIPPING.

contact: DISKTRONICS
P.O. BOX 962
BEDFORD, IN 47421

Ph. (812) 279-1752
Mon-Sat 0800-1600 EST
©1985 DISKTRONICS

WHAT IS THIS GIRL DOING?

THE			GIRL				IS-	
TH AX	PAS	GG3	ER2	LL	PAS	IH	SS	
29 15	04	34	52	45	04	12	55	

FEEDING								
PAS	FF	IY	PA3	DD2	IH	NG	PAS	BB1
04	40	19	02	33	12	44	04	28

BREAD						TO	
RR1	EH	EH	PA1	DD1	PAS	TT2	UW2
14	07	07	00	21	04	13	31

A		DUCK			
PAS	EY	PAS	DD2	AA	KK2	PAS
04	20	04	33	24	41	04

You can now have your computer speak to you . . . with the inevitable "Kilobaud Monster." This remarkable breakthrough in engineering is now being offered to the general public by Computel, and is made possible at a fraction of the cost you'd expect to pay anywhere else. You will also learn how computers speak, what speech synthesis is, and the basics behind phonemics. It's a great educational tool for the individual and for the institution alike!

The Kilobaud Monster is a revolutionary item for the hobbyist, because now you can have many new resources available for experimentation. No longer is this field of science limited to the lab, and no longer is its cost limited to governmental research projects. You can make your computer speak with little effort, a lot easier than you think!

The quality of speech pronunciation is excellent. Anything imaginable may be spoken, from scientific thru slang words—we include detailed instructions showing you exactly how to do this. You can now have all the satisfaction of doing this yourself, at a fraction of the cost, and having something really useful to show for your efforts!

VISA

MasterCard

Devant
si je Puis

KILOBAUD MONSTER?

YOUR COMPUTER WILL TELL YOU! DON'T THEY ALL NOW "SPEAK?" . . .

- Able to work with any computer!
- Complete instructions included!
- User-programmable vocabulary of virtually unlimited size!
- Program it to say anything you want!
- Guaranteed to hold your interest and delight for hours!

ONLY $9.95 *regular price* *

Introductory package includes everything you need to get started!

** SAVE—Computel members only $ 7.95.*

The Kilobaud Monster is the basis of a series of projects that can make your computer talk, and is necessary for later projects. The Kilobaud Monster will set you up with everything you need to know in order to attach it to your computer and enable it to speak words. All additional information is included with this beginner's package. The built-in editor in the Wordmaker enables you to easily "fine tune" every word you create to make it sound exactly as you wish. Or you can set up a "word bank" with the Message Talker that includes all the phrases and statements that you'll ever need! The Artificial Intelligence accessory will permit your computer to produce totally random sentences, following all the rules of correct grammar within a pre-defined vocabulary-set, all day long!

If you're new to the computer field, or if you're an old-time "hacker," you'll want to subscribe to our publication "Computel," which covers everything that YOU want to see! Encompassing the subjects of Computers, Electronics, and Telecommunications, this publication gives you a "new meaning" of the free enterprise system and the monopoly of existing organizations. You'll need to become part of this international hobbyist phenomenon really soon. SAVE $2.00 on EACH ITEM you buy if you subscribe to Computel now! And this is IN ADDITION to the total package price for the Complete KILOBAUD MONSTER Collection—you'll SAVE OVER $18. Dealer and educational institution inquiries invited. Circle our Reader Service Number for additional information.

You may order these products from us by sending a check, money order, postage or cash in U.S. negotiable funds only, to the address indicated below. Or you may charge your order to your Visa or Master Card. Please include $2.00 shipping and handling on all orders. California residents please add sales tax. Allow three weeks for delivery. Add $5.00 for next-day *shipment* by U.P.S.; $15.00 for next-day *delivery* by U.S.P.S. We guarantee your satisfaction for 90 days with our products, and offer a money-back guarantee if not fully satisfied during that period.

COMPUTEL PUBLISHING SOCIETY
6354 VAN NUYS BLVD., SUITE 161 / VAN NUYS, CA 91401-2696

YES, I'm interested in making my computer talk. Please send me the following items:

- ☐ INTRODUCTORY PACKAGE ..... $ 9.95
- ☐ WORDMAKER ..... $ 19.95
- ☐ MESSAGE TALKER ..... $ 14.95
- ☐ ARTIFICIAL INTELLIGENCE ..... $ 24.95
- ☐ COMPLETE COLLECTION SET (SAVE $10) ..... $ 59.50
- ☐ One year subscription to Computel, . $ 14.00
- ☐ including all Kilobaud Monster items $ 65.50

PLEASE ADD $2.00 SHIPPING & HANDLING TO YOUR ORDER. G-3

CREDIT CARD _____ EXP. DATE _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Your Computer _____

SEND ALL PAYMENT IN U.S. FUNDS DRAWN ON U.S. BANKS • SORRY, NO C.O.D.'S

Make checks payable to: COMPUTEL PUBLISHING SOCIETY
Post Office Drawer 7765 / VAN NUYS, CA 91409-7765

Software Discounters of America (& Peripherals, too!)

For Orders Only — 1-800-225-7638*

Inquires and PA 412-361-5291

- Free Shipping on orders over $100 in continental USA
- No surcharge for VISA/MASTERCARD

ACCESS
Beach Head (TorD) ..$21
Beach Head II (D) ...$27
Mach 5 (R) $23
Raid Over Moscow (TorD) ...$25
ACTIVISION
Decathalon (D) $21
Ghostbusters (D) $23
Master of Lamps (D) ..$21
Mindshadow (D) $21
Pitfall II (D) $21
Rock 'N Bolt (D) $21
Space Shuttle (D) ...$21
The Music Studio (D) $21
Tracer Sanction (D) ..$21
ARTWORX
Alice in Videoland (D)$16
Bridge 4.0 (TorD) $16
French (D) $19
German (D) $19
Ghostchasers (D) ...$16
Grand Master Chess (D) $19
Italian (D) $19
Slap Shot Hockey (D) $16
Spanish (D) $19
Strip Poker (D) $21
Female Data Disk ...$18
Male Data Disk $18
BLUE CHIP
Baron (D) $27
Millionaire (D) $27
Tycoon (D) $27
BRODERBUND
Bank St. Writer (D) ..$33
Castles Dr. Creep (D) $21
Champ Loderunner(D)$23
Karateka (D) .....Call
Loderunner (D) $21
Mask of the Sun (D)..$27
Music Shop (D) $29
Print Shop (D) $29
Print Shop Graphics Library Disk $19
Raid on Bungeling Bay (D) $21
Spelunker (D) $21
Stealth (D) $21
Whistler's Brother (D)$21
CBS
Algebra Series .....Call
Big Bird's Spc. Del. (R)$17
Dinosaur Dig (D) $27
Dr. Seuss (D) $21
Felony (D) $23
Goren Bridge (D) $49
Mastering the SAT (D) $89
Match Wits (D) $19
Math Series .....Call
Murder by Dozen (D) .$23
CONTINENTAL
Book of Adv. Games .$16
Home Accountant (D)$47
Home Cataloger $33
CREATIVE
Break Street (D) $17
Crisis Mountain (R) ..$12
Easy Disk (D) $21
Tolls & Tribulations(D)$19
DATASOFT
Bruce Lee (D) $23
Conan (D) $23
Dig Dug (D) $19
Lost Tomb (T/D) $19
Pac Man (D) $19
Pole Position (D) $19
Pooyan (TorD) $19
DAVIDSON
Math Blaster (D) $33
Speed Reader II (D) ..$43
Spell It (D) $33
Word Attack (D) $33
ELECTRONIC ARTS
Adv. Construction Set (D) $35
Archon (D) $27
Archon II (D).....$27
Cut & Paste WP (D) ..$35
Financial Cookbook (D).....$35
Hard Hat Mack (D)...$23
Mail Order Monsters (D) $23
Music Construction Set (D) $27
One-on-One (D) $27
Pinball Construction Set (D) $27
Racing Destruction Set (D) $23
Seven Cities of Gold (D) $27
EPYX
Barbie (D) $21
Chip Wits (D) $21
Fast Load (R) $25
GI Joe (D) $21
Hot Wheels (D) $21
Impossible Mission(D)$23
Monty's Scrabble (D) $27
Pitstop II (D).....$27
Robots of Dawn (D)..$25
Summer Games (D)..$25
Summer Games II (D)Call
Two-on-Two Sports (D) .....Call
World's Greatest Baseball (D) $23
FIRST STAR
Spy vs. Spy (D).....$19
FISHER PRICE
All Titles Available ..Call
FUTUREHOUSE
CPA (D).....$49
Light Pen w/Peripheral Vision (D).....$39
GAMESTAR
On-Court Tennis (D) .$21
On-Field Football (D) $21
Star-League Baseball (D) $21
HBJ
Computer SAT (D)...$49
HAYDEN
Sargon II (D).....$16
Sargon III (D) $33
HES
Graphics Basic (D) ..$23
Hes Mon 64 (R) $27
Multiplan (D) $59
64 Forth (R) $27
INFOCOM
Enchanter (D) $23
Hitchhiker's Guide to the Galaxy (D) $23
Infidel (D) $27
Planetfall (D) $23
Seastalker (D) $23
Sorcerer (D) $27
Zork .....Call
KOALA
Muppet Learning Keys (D) $49
Tablet w/Painter (D) .$53
Tablet w/Painter (R) .$65
Koala Printer (D) $19
LEARNING COMPANY
Addition Magician (D) $23
Gertrudes Secrets (D)$19
Moptown Parade (D) .$27
Rocky's Boots (D) ...$23
MICROPROSE
F-15 Strike Eagle (D) .$23
Hellcat Ace (TorD)...$19
Kennedy Approach (D)$23
Mig Alley Ace (D)....$23
Nato Commander (D) $23
Solo Flight (TorD) ...$23
Spitfire Ace (TorD) ..$19
MINDSCAPE
Bank St. Music Writer (D) $33
Bank St. Storybook (D)$27
Color Me: The Computer Coloring Kit (D) ...$21
Crossword Magic (D) $33
Indiana Jones (D) ...$21
Mr. Pixel's Cartoon Kit (D) $23
Mr. Pixel's Programming Paint Set (D).....$23
Preparation SAT (D) .$49
ORIGIN
Ultima III (D).....$39
PRACTICORP
Practicalc (D).....$23
Practifile (D).....$23
64 Doctor (D) $17
PRECISION
Superbase 64 (D)....$49
PROFESSIONAL SOFTWARE
Trivia Fever (D) $25
Fleet System 2-80 column word processor w/70,000 word spell checker (D) $49
RESTON
Movie Maker (D) $35
SCARBOROUGH
Boston Computer Diet (D).....$33
Build a Book (D).....$27
Mastertype (D).....$23
Net Worth (D).....$49
Writing Wizard (D)...$27
SIERRA ON LINE
Homeword (D).....$33
Stunt Flyer (D).....$27
Ultima II (D).....$39
SIMON & SCHUSTER
Gonzo in Wordrider(D)$21
Kermit's Electronic Storymaker (D) ...$21
Lovejoy's SAT (D)...Call
NY Times Crossword Puzzles Vol. I or II (D).....$16
Typing Tutor III (D) ..$27
SPINNAKER
Adv. Creator (R).....$21
Alphabet Zoo (R)....$21
Counting Parade (D) .$17
Delta Drawing (R)....$17
Facemaker (R).....$17
Fraction Fever (R)...$17
Kidwriter (D) $17
Kindercomp (R).....$19
Math Busters (D)....$17
Most Amazing Thing (D) $17
Story Machine (R)...$17
Snooper Troops 1 or 2 (D).....$17
Trains (D).....$17
SPRINGBOARD
Early Games (D).....$23
Easy as ABC (D) $27
Fraction Factory (D) .$19
Newsroom (D).....Call
Stickers (D) $23
SSI
Baltic '85 (D) $25
Battle Normandy (D) .$27
Broadsides (D).....$27
Carrier Force (D) $39
Comp. Baseball (D)..$27
Computer QB (D)....$27
Field of Fire (D) $27
50 Mission Crush (D) $27
Gemstone Warrior (D)$23
Germany 1985 (D) ...$39
Kampfgruppe (D)....$39
Pro Tour Golf (D) $27
Questron (D) $27
Rails West (D) $27
Ringside Seat (D) ...$27
SUBLOGIC
Flight Simulator II (D) .$35
Night Mission Pinball (TorD).....$21
SYNAPSE
Blue Max (D) $21
Blue Max 2001 (D) ...$21
Ft. Apocalypse (D) ..$21
Pharoah's Curse (D) .$21
Quasimodo (D) $17
Zaxxon (D) $25
TELARIUM
Amazon (D) $23
Dragonworld (D) $23
Fahrenheit 451 (D)...$23
Rendezvous w/Rama (D).....$23
TIMEWORKS
Cave Word Wizard (D) $23
Data Manager II (D) ..$33
Electronic Checkbook (D)....$17
Evelyn Wood Reader (D) $33
Money Manager (D)..$17
Swiftcalc (D) $33
Word Writer w/Speller (D) $33
TRONIX
S.A.M. (D).....$39
WAVEFORM
Musicalc I (D).....$21
Musicalc II (D) $16
Musicalc III (D) $16
Colortone Keyboard .$29
ACCESSORIES
BASF SS, DD....$14 Bx.
Cardco Access. .....Call
Compuserve Starter Kit (5 hrs.).....$23
Data Share Printer Int. w/Graphics ...$44
Disk Case (Holds 50)..$9
Disk Case (Holds 100) $19
Disk Drive Cleaner ...$9
Dow Jones News Retrievel Kit (5 hrs.) $23
Dust Covers .....Call
Generic Disks ...Cheap
Total AA/AD Modem w/Software .....Call
Wico Boss $12
Wico Bat Handle $19

P.O. BOX 278—DEPT CG—WILDWOOD, PA 15091

***Ordering and Terms:** Orders with cashier check or money order shipped immediately. Personal/company checks, allow 3 weeks clearance. No C.O.D.'s. **Shipping: Continental U.S.A.**—Orders under $100 add $3; **free shipping on orders over $100.** PA residents add 6% sales tax. **AK, HI, FPO-APO**—add $5 on all orders. **International Order Policy**—No Credit Cards—add $15 or 15% of order whichever is greatest. Defective merchandise will be replaced with same merchandise—NO CREDITS! Return must have authorization number (412) 361-5291. Prices subject to change without notice.

Home computer software packages for $1.00? Ridiculous?
The priviledge of trying out software before buying? Impossible?
Read on.

We really do have something "new under the sun."

Not only do we provide discounts on software to club members comparable to discounts anywhere:

1) Club members can **"try out" software before buying** (we do this by a policy of accepting 3 "returns" for a small fee).

2) periodic auctions on software permit members to **buy software at truly insane prices** (like $1.00) and **sell old software.**

*****CAN YOU AFFORD NOT TO FOLLOW THIS UP???*****

See if we're for real at

PASTIMES

5 Continental Ave., Forest Hills, N.Y. 11375
(in the minimall)
(Phone 718-263-4747)
Drop in, call, or write (asking for Club particulars)

COMMODORE HARDWARE, COMPUTER ACCESSORIES, SOFTWARE, CLASSES AND EXPERT ASSISTANCE.

---

964 DRILL ABC's

PRE-SCHOOL THRU 4th GRADE - FOR COMMODORE 64

GIVE YOUR CHILDREN THE OPPORTUNITY TO REINFORCE AND REFINE THEIR ACADEMIC SKILLS WHILE AT HOME.

THE 964 DRILL HAS THE PATIENCE OF A SAINT (AT YOUR OPTION) OR THE DRIVE OF A DRILL INSTRUCTOR.

\+ − SUBJECTS (ALL SUBJECTS INCLUDED) ÷ X

ADDITION SUBTRACTION DIVISION MULTIPLICATION
TIMES TABLES ALPHABET SPELLING

FEATURES

- MENU DRIVEN TIMED DRILLS - OPTIONS FOR DIFFICULTY
- TIMES TABLE, ALPHABET, & SPELLING DRILLS HAVE REVIEWS
- STOP-KEY STOPS TIMER FOR INDEFINITE PERIOD OF TIME TO ALLOW PARENT OR TEACHER TO EXPLAIN PROBLEM & FOR BREAKS
- WILL PRINT PROBLEMS ANSWERED INCORRECTLY (AT USER'S OPTION, PRINTER REQUIRED)
- WHEN USED WITH COMMODORE'S Magic Voice SPEECH MODULE, THE 964 DRILL WILL TALK TO YOU
- SPELLING VOCABULARY OF OVER 150 WORDS
- BIDIRECTIONAL INPUT FOR ADDITION, SUBTRACTION, AND MULTIPLICATION

DISK ONLY **$29.95** SEND CHECK, MO, VISA, OR MASTER CD (INCL. EXPR. DATE FOR CREDIT CARD)

To: TOFACTUM
DEPT G
PO BOX 34218
HOUSTON, TX 77234

TEXAS RESIDENTS ADD $1.80 SALES TAX.
COMMODORE 64 AND "MAGIC VOICE" ARE REGISTERED TRADEMARKS OF COMMODORE ELECTRONICS LTD.

ACORN OF INDIANA TM

STOCK BROKER: Calculates recommendations that will have you buying the most shares at the bottom and selling the most shares at the top of your stocks price cycles.
- Buy and sell recommendations in exact share amounts
- All stock transactions and prices recorded in Stock History files
- File editing functions
- Bar Graphs plotted from Stock History files
- Prints out Recommendations, Stock Historys, and Graphs

$49.95 C-64 Disk only

LOTTO CYPHER: Get the best odds on any lottery game. Six number, pick-four, daily games, etc.
- Produces four combinations of numbers to choose from Including, computers best pick and least likely pick
- Any amount of balls and numbers can be programed
- Prints out past lotto numbers drawn, past computer picks, and number draw frequency list
- Complete number data base

$29.95 C-64 Disk only

Send check or money order to:

ACORN OF INDIANA, INC.
2721 Ohio Street
Michigan City, IN. 46360

Add $1.50 Shipping
Indiana residents add 5% sales tax

Dealer Inquiries Welcome

ENHANCE YOUR COPY OF
SpeedScript 3.0*

Add These Useful Utilities for the C-64**:

PowerPrint! just set the cursor to your choice of start and finish location; print one character, one line, or the entire document!

PowerParams! Assign as many as eight character codes to one alpha printer command, save them to a standard text file, then set or release a printer function with only one embedded text command!

PowerSet! For all printers that reproduce the Commodore characters: text codes that permit you to access both character sets; switching even while printing!

PowerPacked Performance that uses only a small portion of text memory!

only $4.98 (typed listing) $7.98 (tape or diskette)
(SpeedScript 3.0 not included)

send check or money order to

LIDON Enterprises
P.O.Box 773
Elm Grove, WI 53122

**Reg. T.M. Commodore Bus. Mach., Inc.
*(c)COMPUTE! Publications, Inc.

THE MASTER BBS IS HERE

A PROFESSIONALLY DESIGNED ELECTRONIC BULLETIN BOARD SOFTWARE PACKAGE. REQUIRES A C-64 DISK DRIVE AND 1650 MODEM (OR COMPATIBLE TYPE). REGISTRATION IN NATIONWIDE BBS NETWORK INCLUDED.

SOFTWARE FEATURES:
BULLETIN & MISCELLANEOUS FILES EDITOR & TERMINAL PROGRAM
PUBLIC & PRIVATE MESSAGES
DOWN/UPLOADING IN ASCII
CHAT WITH SYSTEM OPERATOR MODE
UNCRASHABLE SECURITY
LOCAL & REMOTE SYSOP ROUTINES
EASY TO MODIFY & EASY TO USE!

ONLY $34.95 - WE PAY SHIPPING
(CALIF. RESIDENTS ADD $2.10 SALES TAX)

CARTER ENTERPRISES
412 JAMAICA WAY
BAKERSFIELD, CA 93309
BBS PHONE (805) 831-2155

tri FACT

2 PLAYERS OR TEAMS
A TERRIFIC PARTY GAME
NO TYPING REQUIRED

- Win by answering triFACTa's fascinating questions
- Over 20 hours of play with no questions repeating
- Play for a few minutes or several hours
- Dozens of subjects
- Use as a fun learning tool
- Play at different skill levels
- You can even add your own questions!
- For the Commodore 64™ with disk drive

triFACTa is only $16.95 from:
SOFTWARE CONCEPTS
P.O. Box 93333
Hollywood, CA 90093
(213) 851-1573

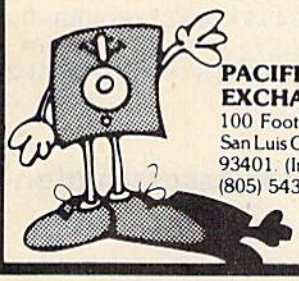
MasterCard VISA

Immediate air mail shipping (personal checks delay shipment three weeks). Please add $2.00 for shipping. California residents also add $1.17 sales tax.

wabash®

When it comes to Flexible Disks, nobody does it better than Wabash.

MasterCard, Visa Accepted.
Call Free: (800) 235-4137



PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA 93401. (In Cal. call (805) 543-1037.)

C64 COVERS
PROTECT YOUR INVESTMENT

• CUSTOM FIT • • LIGHT TAN •
• LIFETIME WARRANTY •
• WASHABLE •

VIC-20/C-64 COMPUTER; C-1541 DISK DRIVE; C-1530 DATASETTE; C-1525 PRINTER; MPS-801 PRINTER; GEMINI-10/10X PRINTER; EPSON FX80 PRINTER; 1701/1702 MONITOR

* ALL COVERS *
* $6.95 each *

* DISKETTES * (10-PK)
SSDD $9.00
* DISK DRIVE COOLING FAN *
$29.95

Enclose a check or M/O. for items ordered +$2.00 shipping & handling. CA. Residents add 6.5% tax

DES-PRODUCTIONS
9067 BUHMAN St.
DOWNEY,CA 90240
Dealer's Invited

FOR C-64 & SX-64

RENUMBER WITH SYNTAX CHECK

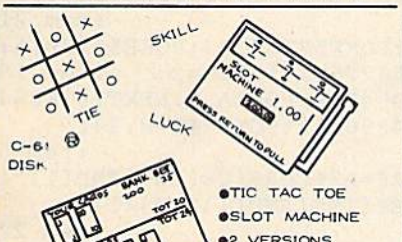
Peforms a syntax check on all errors related to program flow. Checks syntax on GOTO, GOSUB, ON . . . GOTO, ON . . . GOSUB, and (IF) THEN statements. Checks that the branch numbers in the above statements are found as a line number. Directions for use and explanation of error messages are included. Copiable. Send a $10 money order or personal check to:

Ray Vallieres
309 Beaver St., Apt. 6
North Adams, MA 01247

Allow time for personal check to clear.

c 1985 by Raymond H. Vallieres, Jr.

4 GAMES
FOR ONE LOW, LOW PRICE...



•TIC TAC TOE
•SLOT MACHINE
•2 VERSIONS OF BLACKJACK

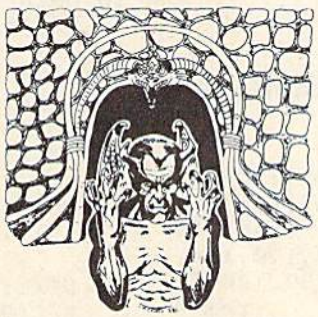
ALL 4 FOR ONE PRICE $16.95

WE PAY SHIPPING AND HANDLING

SEND CHECK OR MONEY ORDER TO:

SOFT-HOUSE SOFTWARE
P.O. BOX - 464
WAYNE, MICHIGAN 48184
ALLOW 4-6 WEEKS FOR DELIVERY

MAGIC

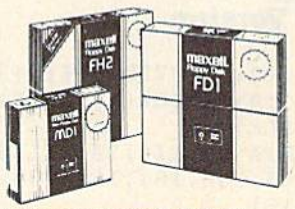


Are you brave enough to save the Beautiful Princess Glasya. She has been abducted by the evil Death Master. Who is the Supreme Ruler of the Nation of Darkness? This is an adventure that will give you an experience you won't soon forget!

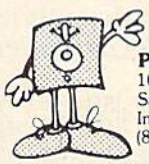
MAGIC is available on DISK or TAPE for the COMMODORE 64 for only $19.95 plus $1.88 for postage and handling.

ZAP Software
S.I.U. Branch
P.O. Box 1586
Edwardsville IL.
62026

Maxell Floppy Disks
The Mini-Disks with maximum quality.



Dealer inquiries invited. C.O.D's accepted.
Call FREE (800) 235-4137.



PACIFIC EXCHANGES
100 Foothill Blvd., San Luis
San Luis Obispo, CA 93401.
In Cal. call (800) 592-5935 or
(805)543-1037

Power BASIC

(Article on page 103.)

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Tape Program Rescue

```
100 A=681                                   :rem 174
110 READ H$:IF H$="**" THEN 180             :rem 236
120 FOR I=1 TO 2:J=ASC(MID$(H$,I,1))-48
                                            :rem 21
130 IF J>9 THEN J=J-7                       :rem 72
140 IF I=1 THEN D=J*16                      :rem 102
150 IF I=2 THEN D=D+J                       :rem 70
160 NEXT:POKE A,D                           :rem 240
170 A=A+1:GOTO 110                          :rem 184
180 PRINT"CUT PROGRAM OFF AT":PRINT"LINE
    {SPACE}NUMBER";:INPUT LN                :rem 121
190 H=INT(LN/256):L=LN-H*256                :rem 90
200 POKE 679,L:POKE 680,H                   :rem 90
210 SYS 681                                 :rem 49
220 DATA A9,00,AA,A8,20,BD,FF,E8,8A,20,BA
    ,FF,98,A6,2B,A4,2C,20,D5,FF,A6,2B,A4
                                            :rem 51
230 DATA 2C,86,FB,84,FC,A0,00,B1,FB,85,FD
    ,C8,B1,FB,85,FE,C8,B1,FB,CD,A7,02,D0
                                            :rem 83
240 DATA 08,C8,B1,FB,CD,A8,02,F0,07,A6,FD
    ,A4,FE,4C,C1,02,A0,00,98,91,FB,C8,91
                                            :rem 252
250 DATA FB,A5,FB,18,69,02,85,2D,A5,FC,69
    ,00,85,2E,00,**                         :rem 78
```

Character Assassination

(Article on page 70.)

Program 1: Character Assassination—VIC Version

```
10 D=22:F=30720:G=1:H=32:DIMA%(39):FORA=1
   TO10:READC%(A),S%(A):NEXT:A$="{RVS}
   {BLK}"                                   :rem 222
20 DATA 28,116,30,111,31,167,144,170,144,
   183,156,184,156,188,158,190,159,180,31
   ,181                                     :rem 4
30 F1=36875:F2=36877:K=250:L=2:POKE36878,
   15                                       :rem 123
50 FORA=1TO22:A$=A$+CHR$(C%(INT(RND(1)*10
   )+1))+CHR$(S%(INT(RND(1)*10)+1))
                                            :rem 209
60 NEXT:POKE36879,30:PRINT"{CLR}{9 DOWN}
   {RED}{6 SPACES}{RVS}CHARACTER":PRINT"
   {DOWN}{4 SPACES}{RVS}ASSASSINATION"
                                            :rem 174
70 PRINT"{3 DOWN}{3 RIGHT}{BLU}ENTER SPEE
   D(0-9)":PRINT"{DOWN}{3 SPACES}9 IS THE
    FASTEST":POKE198,0                      :rem 10
80 GETB$:IFB$<"0"ORB$>"9"THEN80             :rem 230
90 S=28-3*VAL(B$):PRINT"{CLR}"SPC(7)"
   {RVS}{RED}SCORE{OFF} 0"                  :rem 67
95 FORA=8164TO8185:POKEA,160:POKEA+F,6:NE
   XT                                       :rem 130
100 FORA=1TO20:PRINT:NEXT:PRINTA$;
                                            :rem 211
110 FL=0:FORA=7724TO7745:POKE649,1:SS=25:
    IFA%(A-7724)=0THEN170                   :rem 97
120 NEXTA:POKE198,0:IFFLTHEN110             :rem 150
130 PRINT"{HOME}{9 DOWN}{OFF}"SPC(7)"
    {BLU}GAME OVER":PRINT"{2 DOWN}
    {3 SPACES}{RED}PLAY AGAIN? (Y/N)"
                                            :rem 15
140 GETA$:IFA$="Y"THENPRINTSPC(9)"{DOWN}
    {BLK}OK":RUN                            :rem 188
150 IFA$="N"THENPOKE828,0:SYS828            :rem 144
160 GOTO140                                 :rem 101
170 FL=1:R1=RND(1):R2=(-(R1<.5)*(RND(1)*9
    +48))+(-(R1>=.5)*(RND(1)*26+1))
                                            :rem 233
180 R$=CHR$(R2-(R2<30)*64):C=A+418:FORB=A
    TOCSTEPD:POKEF1,K-L*SS                  :rem 1
190 SS=SS-1:GETA$:IFA$<>""THENPOKE649,0:I
    FA$=R$THEN220                           :rem 237
200 POKEB-D,H:POKEB,R2:POKEB+F,.            :rem 185
210 FORTD=GTOS:NEXTTD:NEXTB:Q=1:GOSUB230:
    POKEB-D,H:A%(A-7724)=1:NEXTA:GOTO110
                                            :rem 144
220 Q=0:GOSUB230:POKEB-D,H:SC=SC+SS:PRINT
    "{HOME}{RED}{OFF}"SPC(12)SC:NEXTA:GOT
    O110                                    :rem 96
230 POKEF1,0:Z=200:POKEB-D+F,2:FORT=1TO20
                                            :rem 205
240 POKEF2,Z:POKE36864,5+(Q=1):POKEB-D,42
    -4*(PEEK(B-D)=42)                       :rem 41
250 Z=Z-(Q=0)*2:POKE36864,5:NEXT:POKEF2,0
    :RETURN                                 :rem 197
```

Program 2: Character Assassination—64 Version

```
10 D=40:F=54272:G=1:H=32:DIMA%(39):FORA=1
   TO10:READC%(A),S%(A):NEXT:A$="{RVS}
   {BLK}"                                   :rem 230
20 DATA 149,116,150,161,151,184,159,190,1
   53,163,154,181,28,182,129,183,30,163
                                            :rem 218
30 DATA 31,170:POKE53265,23:POKE53280,6:F
   1=54273:V1=54276:K=150:L=2               :rem 183
40 FORA=54272TO54295:POKEA,0:NEXT:POKE542
   77,23:POKE54296,15:POKE54278,241
                                            :rem 54
50 FORA=1TO40:A$=A$+CHR$(C%(INT(RND(1)*10
   )+1))+CHR$(S%(INT(RND(1)*10)+1))
                                            :rem 209
60 NEXT:POKE53281,15:PRINT"{CLR}{9 DOWN}"
   SPC(9)"{RED}{RVS}CHARACTER ASSASSINATI
   ON"                                      :rem 41
70 PRINT"{3 DOWN}{3 RIGHT}{BLU}ENTER SPEE
   D 0-9 (9 IS THE FASTEST)":POKE198,0
                                            :rem 238
80 GETB$:IFB$<"0"ORB$>"9"THEN80             :rem 230
90 S=28-3*VAL(B$):PRINT"{CLR}"SPC(15)"
   {RVS}{RED}SCORE{OFF} 0"                  :rem 114
100 FORA=1TO22:PRINT:NEXT:PRINTA$;
                                            :rem 213
```

```
110 FL=0:FORA=1104TO1143:POKE649,1:SS=39:
    IFA%(A-1104)=0THEN170          :rem 60
120 NEXTA:POKE198,0:IFFLTHEN110    :rem 150
130 PRINT"{HOME}{9 DOWN}{OFF}"SPC(15)"
    {BLU}GAME OVER":PRINT"{2 DOWN}"SPC(11
    )"{RED}PLAY AGAIN? (Y/N)"      :rem 27
140 GETA$:IFA$="Y"THENPRINTSPC(17)"{DOWN}
    {BLK}OK":RUN                   :rem 235
150 IFA$="N"THENPOKE828,0:SYS828   :rem 144
160 GOTO140                        :rem 101
170 FL=1:R1=RND(1):R2=(-(R1<.5)*(RND(1)*9
    +48))+(-(R1>=.5)*(RND(1)*26+1))
                                   :rem 233
180 POKEV1,33:R$=CHR$(R2-(R2<30)*64):C=A+
    840:FORB=ATOCSTEPD:POKEF1,K-L*SS
                                   :rem 130
190 SS=SS-1:GETA$:IFA$<>""THENPOKE649,0:I
    FA$=R$THEN220                  :rem 237
200 POKEB-D,H:POKEB,R2:POKEB+F,J   :rem 213
210 FORTD=GTOS:NEXTTD:NEXTB:Q=1:GOSUB230:
    POKEB-D,H:A%(A-1104)=1:NEXTA:GOTO110
                                   :rem 130
220 Q=0:GOSUB230:POKEB-D,H:SC=SC+SS:PRINT
    "{HOME}{RED}{OFF}"SPC(20)SC:NEXTA:GOT
    O110                           :rem 95
230 POKEV1,129:Z=2:POKEB-D+F,2:FORT=1TO20
                                   :rem 233
240 POKEF1,Z:POKE53270,200-7*(Q=1):POKEB-
    D,42-4*(PEEK(B-D)=42)          :rem 222
250 Z=Z-(Q=0)*2:POKE53270,200:NEXT:POKEV1
    ,128:RETURN                    :rem 146
```

Squares

(Article on page 58.)

```
10 POKE53281,0:POKE53280,0:PRINT"{WHT}"
                                   :rem 198
20 DIMIN(15,4):FORA=984TO1023:POKEA,32:NE
   XT                              :rem 75
30 DR(0)=-40:DR(1)=1:DR(2)=40:DR(3)=-1
                                   :rem 235
40 CL(1)=3:CL(2)=4:CL(3)=11:CL(4)=9
                                   :rem 82
50 P(1)=1360:P(2)=1358:P(3)=1440:P(4)=143
   8:CO=54272                      :rem 150
60 FORX=1TO4:P(X)=1024+INT(RND(1)*15)*2+I
   NT(RND(1)*10)*80:NEXT           :rem 61
70 GOTO560                         :rem 59
80 PRINT"{CLR}";:FORX=1TO10:FORY=1TO15:PR
   INT"Q ";:NEXT:PRINT:PRINT:NEXT:rem 122
90 GOSUB630:PRINTTAB(22);"{DOWN} I{DOWN}
   {2 LEFT}J+K{DOWN}{2 LEFT}M"     :rem 1
100 QF=1:FORPL=1TO4:P=P(PL):CL=CL(PL):Q=0
    :FL=0                          :rem 79
110 P1=P:GOSUB380:P2=SI:LF=0       :rem 195
120 GOSUB470:GOSUB630:PRINT"{2 DOWN}PLAYE
    R"PL"'S TURN";:POKE646,CL:PRINT"
    {2 SPACES}Q{WHT}"              :rem 126
130 PRINT "{21 SPACES}"            :rem 101
140 GOSUB380                       :rem 176
150 IN=IN(SI,PL):IFIN=0THENGOSUB290
                                   :rem 205
160 GOTO500                        :rem 101
170 IFABS(IN)=1THENPOKEP+IN,67:GOTO190
                                   :rem 105
180 POKEP+IN,66                    :rem 114
190 POKEP+CO,1:POKEP+CO+IN*2,CL:POKEP+IN+
    CO,CL                          :rem 117
200 P(PL)=P+IN*2:GOSUB410          :rem 201
210 IF(S1=15)AND(PEEK(X+D)=32)THENPOKEX+D
    ,160:POKEX+D+CO,CL:B(PL)=B(PL)+1
                                   :rem 94
220 IF(S2=15)AND(PEEK(X-D)=32)THENPOKEX-D
    ,160:POKEX-D+CO,CL:B(PL)=B(PL)+1
                                   :rem 102
230 P=P(PL):GOSUB520               :rem 176
240 GOSUB380:IFP1=PANDP2=SITHENLF=1:Q=9
                                   :rem 230
250 IFQ=>9THEN270                  :rem 243
260 Q=Q+1:GOTO140                  :rem 219
270 IFLF=0THENQF=0                 :rem 90
280 NEXTPL:GOTO640                 :rem 130
290 GOSUB630:PRINT"{3 DOWN}WHAT DIRECTION
    ":POKEP+CO,CL:POKE198,0        :rem 95
300 IFTY(PL)=2THENGOSUB340:Q=10:GOTO330
                                   :rem 163
310 GETA$:IFA$<>"I"ANDA$<>"M"ANDA$<>"J"AN
    DA$<>"K"THEN310                :rem 149
320 Q=10:D=(A$="J")*-3+(A$="K")*-1+(A$="M
    ")*-2                          :rem 183
330 IN(SI,PL)=DR(D):IN=IN(SI,PL):RETURN
                                   :rem 190
340 IFSI=15THEND=INT(RND(1)*4):RETURN
                                   :rem 47
350 IFFL=>4THEND=INT(RND(1)*4):RETURN
                                   :rem 50
360 D=INT(RND(1)*4):IF(SIAND2↑D)=2↑DTHEN3
    60                             :rem 80
370 FL=FL+1:RETURN                 :rem 113
380 SI=0:FORX=0TO3:I=PEEK(DR(X)+P):rem 80
390 IFI<>32THENSI=SI+2↑X           :rem 10
400 NEXT:RETURN                    :rem 237
410 S1=0:S2=0:X=(P(PL)+P)/2:IFABS(X-P)=1T
    HEND=40:GOTO430                :rem 60
420 D=1                            :rem 72
430 FORY=0TO3:Z=PEEK(X+DR(Y)+D):IF(Z=66)O
    R(Z=67)THENS1=S1+2↑Y           :rem 46
440 NEXT                           :rem 215
450 FORY=0TO3:Z=PEEK(X+DR(Y)-D):IFZ=(66)O
    R(Z=67)THENS2=S2+2↑Y           :rem 52
460 NEXT:RETURN                    :rem 243
470 GOSUB630:PRINT"{19 SPACES}"    :rem 191
480 PRINT"{18 SPACES}"             :rem 109
490 PRINT"{18 SPACES}":GOTO520     :rem 120
500 IFPEEK(P+IN*2)=81THEN170       :rem 117
510 GOSUB630:PRINT:GOSUB480:GOSUB630:PRIN
    T"{DOWN}ILLEGAL MOVE":GOSUB290:GOTO14
    0                              :rem 201
520 PRINT"{HOME}":FORX=1TO4        :rem 57
530 PRINT TAB(29);" PLR."X;:POKE646,CL(X)
    :PRINT"Q{WHT}"                 :rem 52
540 PRINTTAB(30);B(X):NEXT         :rem 80
550 RETURN                         :rem 122
560 PRINT"{CLR}{6 DOWN}{RVS}{13 SPACES}"SPC(16)"S
    QUARES{WHT}"                   :rem 3
570 PRINT"{7 DOWN}{10 SPACES}{CYN}1. PLAY
    ER CONTROLLED                  :rem 131
580 PRINT"{WHT}{DOWN}{10 SPACES}{GRN}2. C
    OMPUTER CONTROLLED             :rem 69
590 FORX=1TO4                      :rem 34
600 PRINT"{YEL}{HOME}{10 DOWN}{8 SPACES}S
    NAKE "X" (CHOOSE 1 OR 2){WHT}"
                                   :rem 235
610 GETA$:IFVAL(A$)>2ORVAL(A$)=0THEN610
                                   :rem 27
620 TY(X)=VAL(A$):NEXT:GOTO80      :rem 24
630 PRINT"{HOME}":FORQQ=1TO18:PRINT:NEXT:
```

```
    RETURN                          :rem 20
640 IFQF=0THEN100                   :rem 237
650 PRINT"{CLR}{6 DOWN}"SPC(14)"{RVS}G
    AME OVER!{3 DOWN}"              :rem 130
660 FORX=1TO4:POKE 646,CL(X):PRINTTAB(7)"
    {DOWN}PLAYER"X;"...."B(X)" SQUARES"
                                    :rem 183
670 NEXT                            :rem 220
680 PRINT"{3 DOWN}"SPC(10)"{WHT}ANOTHER G
    AME? (Y/N)":POKE198,0           :rem 123
690 GETA$:IFA$="Y"THENRUN           :rem 16
700 IFA$="N"THENPRINT"{CLR}":END    :rem 254
710 GOTO690                         :rem 112
```

Dynamic SID Editor

(Article on page 88.)

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

```
100 GOTO1000:REM{25 SPACES}***** 16-BIT C
    ALCULATION *****            :rem 239
200 KK=PEEK(KEY):IFKK=NULLTHEN200 :rem 92
205 REM KEY PRESSED, USE VARS FOR SPEED
                                :rem 39
210 J=BB:Z=PEEK(H+BB):HH=PEEK(SHFT)
                                :rem 142
215 REM CUR-UP=7,CUR-LFT=2,RETURN=1
                                :rem 190
220 ONKKGOTO240,250,230,230,230,230,260
                                :rem 33
230 RETURN:REM NO VALID KEY, KEEP VALUE
                                :rem 87
240 J=INT((Z+BB)*K/CC):GOTO260  :rem 232
245 REM VRY FAST,LARGER FOR HIGHER VALS
                                :rem 107
250 J=K:REM MODERATE INCREMENT  :rem 125
260 Z=PEEK(H)+Z*XX+J*((HH=AA)-(HH>AA))
                                :rem 170
265 REM H SET BY CALLER, ADD INCR :rem 36
266 REM INCR IS POS IF SHIFT KEY DOWN
                                :rem 106
270 IFZ<AATHENZ=AA:REM MIN & MAX VALS
                                :rem 204
280 IFZ>ZZTHENZ=ZZ              :rem 239
290 GOSUB930:REM POSITION CURSOR  :rem 40
295 REM PRINT VALUE IF PITCH OR FILTER
                                :rem 252
300 IFDV<>CCTHENPRINTZ"{LEFT} ":GOTO320
                                :rem 187
305 REM PRINT % OF DUTY CYCLE   :rem 121
310 PRINTINT(Z/4.095)/10"{LEFT}%
    {2 SPACES}"                 :rem 124
315 REM PUT VALUE IN BUFFER     :rem 68
320 POKEH+BB,Z/XX:POKEH,Z-INT(Z/XX)*XX
                                :rem 211
330 IFDV>CCTHEN360:REM BRANCH FOR FLTR
                                :rem 54
335 REM PUT VAL IN SID, BACK FOR MORE
                                :rem 41
340 POKEYY,PEEK(H):POKEYY+BB,PEEK(H+BB)
                                :rem 197
350 GOTO200                     :rem 99
355 REM FILTER IS ODD; 11-BIT VALUE
                                :rem 224
356 REM STORED 3 LOW, 8 HIGH    :rem 252
360 POKEYY,ZAND7:POKEYY+BB,Z/8  :rem 193
370 GOTO200:REM{26 SPACES}***** 8-BIT CAL
    CULATION *****              :rem 154
400 KK=PEEK(KEY):IFKK=NULLTHEN400 :rem 96
405 REM KEY PRESSED, IS IT VALID?:rem 144
410 ONKKGOTO430,430,420,420,420,420,430
                                :rem 38
415 REM NO, RETURN WITH VALUE KEPT:rem 20
420 RETURN                      :rem 118
430 HH=PEEK(SHFT):BB=SBUF+H     :rem 173
435 REM ADD INCREMENT (SAME FOR ANY
                                :rem 11
436 REM VALID KEY), POS IF SHIFT DOWN
                                :rem 102
440 Z=(PEEK(BB)ANDJ)/K+(HH=0)-(HH>0)
                                :rem 6
450 IFZ<0THENZ=0:REM MIN & MAX VALUES
                                :rem 194
460 IFZ>15THENZ=15              :rem 83
470 GOSUB930:PRINTZ"{LEFT}{2 SPACES}":REM
     POS & PRNT                 :rem 51
475 REM MASK ON TO BYTE         :rem 36
480 Z=PEEK(BB)AND255-JORZ*K     :rem 131
485 REM INSERT & GO BACK FOR MORE :rem 65
490 POKEBB,Z:POKESID+H,Z:GOTO400:REM
    {5 SPACES}***** BIT DECODING *****
                                :rem 253
700 YY=PEEK(SBUF+XX):REM VALUE OF BYTE
                                :rem 107
710 Z=INT((YYANDJ)/K):REM VAL OF BIT(S)
                                :rem 30
715 REM MASK VALUES SET BY CALLER:rem 183
720 RETURN:REM{27 SPACES}***** BIT ENCODI
    NG *****                    :rem 97
800 YY=YYAND255-JORZ*K:REM ENCODE :rem 91
810 POKESBUF+XX,YY:REM SET BUFFER:rem 117
820 POKESID+XX,YY:REM SET SID   :rem 76
830 RETURN:REM{27 SPACES}***** CURSOR PLO
    TTER *****                  :rem 69
900 POKECX,WX%(CT)+CL:REM WORD ROW:rem 87
910 POKECY,WY%(CT)+OFS:REM & COLUMN
                                :rem 115
920 GOTO950                     :rem 114
930 POKECX,VX%(CT)+CL:REM VALUE ROW
                                :rem 154
940 POKECY,VY%(CT):REM{5 SPACES}& COLUMN
                                :rem 98
950 SYSMOVE:RETURN:REM MOVE CURSOR:rem 33
996 REM{34 SPACES}** MAIN ROUTINE **
                                :rem 127
1000 GOSUB 50000:REM INITIALIZE
     {10 SPACES}***** KEY INPUT *****
                                :rem 99
1100 KK=PEEK(KEY):IFKK=NULLTHEN1100
                                :rem 188
1105 REM KEY PRESSED, IF SHIFT IS:rem 127
1106 REM DOWN, SKIP ENTRY LEVEL CALC
                                :rem 100
1110 HH=PEEK(SHFT):IFHH=1THEN1500:rem 247
1115 REM ENTRY LEVEL INTO VOICES?:rem 248
1120 IFKK<F1ORKK>F5THEN1500     :rem 129
```

```
1125 REM CHANGE ENTRY LEVEL & CLEAR
                                    :rem 234
1130 EL=KK-4:DV=-1:GOSUB53000:GOTO1100
                                    :rem 224
1496 REM{33 SPACES}***** KEY DISPATCH ***
     **                             :rem 149
1500 IFKK=FTHEN2000:REM FREQUENCY :rem 47
1510 IFKK=PTHEN2000:REM PULSE WIDTH
                                    :rem 145
1520 IFKK=ATHEN3000:REM ATTACK     :rem 51
1530 IFKK=DTHEN3000:REM DECAY      :rem 229
1540 IFKK=STHEN3000:REM SUSTAIN    :rem 182
1550 IFKK=RTHEN3000:REM RELEASE    :rem 144
1560 IFKK=WTHEN4000:REM WAVEFORM   :rem 253
1570 IFKK=GTHEN4000:REM GATE       :rem 168
1580 IFKK=ITHEN4000:REM RING       :rem 186
1590 IFKK=YTHEN4000:REM SYNC       :rem 216
1600 IFKK=QTHEN2000:REM FILTER FREQ
                                    :rem 125
1610 IFKK=NTHEN3000:REM RESONANCE :rem 38
1620 IFKK=VTHEN3000:REM VOLUME     :rem 105
1630 IFKK=MTHEN5000:REM MODE       :rem 176
1640 IFKK=N1THEN5000:REM ASSIGN    :rem 131
1650 IFKK=N2THEN5000               :rem 162
1660 IFKK=N3THEN5000               :rem 164
1670 IFKK=XTHEN5000                :rem 124
1680 IFKK=OTHEN6000:REM OSC3       :rem 171
1690 IFKK=ETHEN6000:REM ENV3       :rem 166
1700 IFKK=TTHEN5000:REM 3 OFF      :rem 158
1705 REM SPECIAL FUNCTIONS         :rem 107
1710 IFKK=F1THENGOSUB7000:GOTO1100:rem 77
1720 IFKK=F3THENGOSUB7000:GOTO1100:rem 80
1730 IFKK=F5THENGOSUB7000:GOTO1100:rem 83
1740 IFKK<>F7ORHH=0THEN1800:REM END?
                                    :rem 178
1750 GETA$:IFA$<>""THEN1750:REM CLR BUF
                                    :rem 214
1760 POKESID+24,0:SYSCS:END:REM END
                                    :rem 159
1800 DV=-1:GOSUB53020:REM NO VALID KEY
                                    :rem 198
1810 GOSUB52000:GOTO1100:REM OOPS
     {8 SPACES}***** 16-BIT EVALUATION **
     ***                            :rem 228
2000 DV=1:IFKK=PTHENDV=2           :rem 238
2010 IFKK=QTHENDV=12               :rem 223
2015 REM DV:1=VOICE FREQ, 2=PLS WDTH
                                    :rem 83
2016 REM 12=FILTER FREQ, CLEAR OLD
                                    :rem 179
2017 REM VARS USED FOR SPEED       :rem 115
2018 REM ZZ=MAX VAL, H=SID REG     :rem 216
2020 GOSUB53020:XX=256:AA=0:BB=1:CC=2
                                    :rem 134
2030 K=29:H=0:ZZ=65535:J=7         :rem 210
2040 IFDV=2THENZZ=4095:H=2          :rem 65
2050 IFDV=12THENZZ=2047:H=21:J=0  :rem 144
2055 REM PRE-CALCULATE BUFFER & SID
                                    :rem 18
2056 REM ENTRY POINTS              :rem 32
2060 YY=SID+EL*J+H:H=SBUF+EL*J+H  :rem 204
2065 REM CALC & DISPLAY VALUES     :rem 208
2066 REM ONCE A NON-VALID KEY IS FOUND
                                    :rem 161
2067 REM IN SUBROUTINE, EXIT WITH KEY
                                    :rem 229
2068 REM VALUE INTACT              :rem 244
2070 GOSUB200:GOTO1110:REM{15 SPACES}****
     * 8-BIT EVALUATION *****       :rem 15
3000 DV=4:H=EL*7+5:J=240:K=16:REM ATCK
                                    :rem 160
3005 REM DECAY, SUSTAIN, RELEASE?:rem 209
3010 IFKK=DTHENDV=5:J=15:K=1       :rem 191
3020 IFKK=STHENDV=6:H=EL*7+6       :rem 200
3030 IFKK=RTHENDV=7:H=EL*7+6:J=15:K=1
                                    :rem 227
3035 REM RESONANCE OR VOLUME?        :rem 5
3040 IFKK=NTHENDV=13:H=23            :rem 5
3050 IFKK=VTHENDV=14:H=24:J=15:K=1:rem 42
3055 REM CLEAR, CALC & DISPLAY VALUES
                                    :rem 99
3056 REM WHEN NON-VALID KEY PRESSED,
                                    :rem 151
3057 REM RETURN WITH VALUE INTACT :rem 15
3060 GOSUB53020:GOSUB400:GOTO1110:REM
     {4 SPACES}***** CTRL BYTE CALCULATIO
     N *****                        :rem 33
4000 DV=-1:GOSUB53020:REM CLEAR    :rem 50
4005 REM SET MASK VALUES           :rem 149
4010 XX=4+EL*7:DV=3:J=240:REM WAVEFORM
                                    :rem 35
4020 IFKK=GTHENDV=8:J=1:REM GATE  :rem 222
4030 IFKK=ITHENDV=9:J=4:REM RING  :rem 244
4040 IFKK=YTHENDV=10:J=2:REM SYNC :rem 56
4050 K=J:IFJ=240THENK=16           :rem 159
4055 REM GO GET VALUE FROM SID BUFFER
                                    :rem 115
4056 REM BRANCH IF WAVEFORM         :rem 87
4060 GOSUB700:IFDV=3THEN4110       :rem 169
4066 REM TOGGLE VALUE              :rem 243
4070 Z=-(Z=0):CL=EL*5:CT=DV         :rem 69
4080 IFZ=1THENPRINT"{RVS}";:REM HIGHLIGHT
                                    :rem 38
4090 GOSUB53070:GOTO4190:REM DISPLAY
                                    :rem 193
4100 REM                           :rem 169
4105 REM INC 0->1,1->2,2->4,4->8,8->0
                                    :rem 77
4110 Z=(Z*2-(Z=0))*-(Z<8)           :rem 31
4120 CT=DV:CL=EL*5:GOSUB930:REM MVE CRS
                                    :rem 111
4125 REM DISPLAY WAVEFORM           :rem 45
4130 A$="-":IFZ=1THENA$="T         :rem 179
4140 IFZ=2THENA$="S                :rem 103
4150 IFZ=4THENA$="P                :rem 103
4160 IFZ=8THENA$="N                :rem 106
4170 PRINTA$                       :rem 190
4180 REM                           :rem 177
4190 GOSUB800:GOTO1100:REM STORE & RTRN
     {2 SPACES}***** FILT/MODE CALCULATIO
     N *****                        :rem 136
5000 DV=-1:GOSUB53020:REM CLEAR OLD
                                    :rem 18
5010 DV=15:CT=DV:CL=0:REM MODE     :rem 36
5015 REM FILTER ASSIGNMENT?       :rem 173
5020 IFKK=N1THENDV=16:H=1:GOTO5500:rem 66
5030 IFKK=N2THENDV=17:H=2:GOTO5500:rem 70
5040 IFKK=N3THENDV=18:H=4:GOTO5500:rem 75
5050 IFKK=XTHENDV=19:H=8:GOTO5500 :rem 40
5055 REM 3 OFF?                     :rem 0
5060 IFKK=TTHENDV=22:GOTO5200      :rem 37
5070 REM                          :rem 176
5075 REM MODE INCREMENT           :rem 127
5080 XX=24:J=112:K=16:GOSUB700    :rem 239
5085 REM INCR 0->1,1->2,2->4,4->0:rem 160
5086 REM PROGRAM MODIFICATION POSSIBLE
                                  :rem 166
5087 REM TO ALLOW MORE THAN ONE MODE
                                    :rem 63
```

```
5088 REM AT THE SAME TIME          :rem 132
5090 Z=(Z*2-(Z=0))*-(Z<4)          :rem 35
5100 GOSUB930:REM MOVE CURSOR      :rem 21
5110 A$=" -":IFZ=1THENA$="LP       :rem 250
5120 IFZ=2THENA$="BP               :rem 165
5130 IFZ=4THENA$="HP               :rem 174
5140 PRINTA$:GOTO5550:REM DISPLAY  :rem 50
5150 REM                           :rem 175
5155 REM TURN 3 OFF                :rem 11
5200 CT=DV:XX=24:J=128:K=1:GOSUB700
                                   :rem 98
5205 REM MASK & TOGGLE             :rem 196
5210 ZZ=128*-((ZANDJ)=0):H=1:GOTO5520
                                   :rem 96
5220 REM                           :rem 173
5225 REM ASSIGN FILTER             :rem 61
5500 CT=DV:XX=23:J=15:K=1:GOSUB700:rem 47
5510 ZZ=H*-((ZANDH)=0):REM MASK & TOGGLE
                                   :rem 17
5520 IFZZ>0THENPRINT"{RVS}";       :rem 202
5530 GOSUB53090:REM DISPLAY        :rem 130
5540 Z=ZANDJ-HORZZ                 :rem 166
5550 GOSUB800:GOTO1100:REM STORE & RTRN
     {2 SPACES}***** I/O INSERT *****
                                   :rem 115
6000 DV=-1:GOSUB53020:REM CLEAR    :rem 52
6005 REM DEFAULT TO OSC            :rem 60
6010 H=OS:CT=20:CL=0:IFKK=OTHEN6030
                                   :rem 119
6015 REM ENVELOPE                  :rem 14
6020 H=EN:CT=21                    :rem 81
6030 J=PEEK(H):REM READ VALUE      :rem 197
6035 REM VALUE SWITCH               :rem 1
6036 REM EITHER 255 (OFF),0 (VOICE 1,
                                   :rem 147
6037 REM LOW),1 (VOICE 1, HIGH), OR 22
                                   :rem 161
6038 REM (FILTER FREQUENCY, HIGH):rem 202
6040 J=-(J=0)-22*(J=1)-255*(J=22):rem 121
6050 POKEH,J:GOSUB930:REM SAVE & MOVE
                                   :rem 184
6055 REM CALCULATE DISPLAY         :rem 88
6060 J=1-(J>0)-(J>1)-(J>22)        :rem 91
6070 PRINTMID$("LHF-",J,1):GOTO1100
                                   :rem 252
6996 REM{33 SPACES}***** FUNCTION KEYS **
     ***                           :rem 8
7000 DV=-1:GOSUB53020:REM CLEAR    :rem 53
7005 REM CANNOT ARRIVE HERE UNLESS:rem 58
7006 REM SHIFT KEY WAS PRESSED, SO
                                   :rem 231
7007 REM F1=F2,F3=F4,F5=F6         :rem 154
7010 H=0:CT=8:J=1:K=1:REM DEFAULT:rem 203
7015 REM F1(F2)=TOGGLE, F3(F4)=ALL OFF
                                   :rem 81
7020 IFKK=F1ORKK=F3THEN7100        :rem 134
7025 REM F5(F6)=ON THEN OFF        :rem 222
7026 REM Z=READ VALUE, SET TO 1    :rem 207
7027 REM WILL CAUSE A TOGGLE TO 0  :rem 51
7028 REM H SERVES TO ADJUST Z      :rem 157
7030 H=1:GOSUB7100                  :rem 2
7040 H=2                           :rem 130
7095 REM VOICE GATES AT SID+4,11,18
                                   :rem 154
7100 FORXX=4TO18STEP7              :rem 79
7105 :REM IF F3, SET TO TURN OFF  :rem 210
7110 :GOSUB700:IFKK=F3THENZ=1      :rem 38
7115 :REM ADJUST FOR F5            :rem 25
7120 :IFH>0THENZ=H-1               :rem 181
7125 :REM CALCULATE DISPLAY ROW    :rem 137
7130 :CL=-5*(XX=11)-10*(XX=18)     :rem 92
7135 :REM DISPLAY AS ON/OFF        :rem 63
7140 :ON(Z<>1)+2GOSUB53060,53070  :rem 255
7150 :Z=-(Z=0):YY=YYAND254ORZ      :rem 39
7155 :REM SAVE IN BUFFER           :rem 112
7160 :POKESBUF+XX,YY               :rem 32
7170 NEXT                          :rem 14
7175 REM MOVE TO SID QUICKLY       :rem 148
7180 FORXX=4TO18STEP7              :rem 87
7190 :POKESID+XX,PEEK(SBUF+XX)     :rem 162
7200 NEXT:RETURN:REM{21 SPACES}** INITIAL
     IZE **                        :rem 218
49995 REM * PUT IN SYSTEM ROUTINES *
                                   :rem 58
49996 REM * CURSOR PLOT ROUTINE *:rem 144
50000 MOVE=679:CX=251:CY=252       :rem 101
50010 FORXX=MOVETOMOVE+7           :rem 61
50020 :READYY:POKEXX,YY            :rem 246
50030 NEXT:REM{27 SPACES}INTERRUPT ROUTIN
     E                             :rem 72
50040 FORXX=712TO760               :rem 167
50050 :READYY:POKEXX,YY            :rem 249
50060 NEXT:REM{27 SPACES}***** VARIABLE A
     SSIGNMENT *****               :rem 59
50100 KEY=203:SHFT=653:NULL=64     :rem 23
50105 REM PEEK(KEY)=VAL OF CURRENT:rem 22
50106 REM KEY DOWN, PEEK(SHFT)>0 IF
                                   :rem 213
50107 REM SHIFT,C=,OR CTRL PRESSED:rem 35
50108 REM PEEK(KEY)=NULL MEANS NO KEY
                                   :rem 179
50110 UP=7:FA=2:LO=1:XX=0:YY=0:ZZ=0:Z=0
                                   :rem 143
50115 REM UP=CURSOR UP/DOWN=SLOW   :rem 46
50116 REM FA=CRSR LFT/RGHT=MODERATE
                                   :rem 183
50117 REM LO=RETURN=FAST            :rem 5
50118 REM NO SHIFT=DOWN, SHIFT=UP:rem 255
50120 KK=0:HH=0:H=0:J=0:K=0:DV=0:CT=0
                                   :rem 131
50125 REM KK HOLDS CURRENT KEY VALUE
                                   :rem 122
50126 REM HH>0 IF SHIFT DOWN       :rem 37
50127 REM DV,CT,CL ARE DISPLAY VALUES
                                   :rem 185
50130 CL=0:AA=0:BB=0:CC=0:SID=54272
                                   :rem 209
50135 REM OP=MOVE INTERRUPT,CS=RESTORE
                                   :rem 229
50140 SBUF=MOVE+8:OP=712:CS=725    :rem 92
50145 REM HIGHLIGHTED KEY VALUES  :rem 189
50150 F1=4:F3=5:F5=6:F7=3          :rem 87
50160 F=21:P=41:W=9:A=10:D=18:S=13:R=17
                                   :rem 177
50170 G=26:I=33:Y=25:Q=62:N=39:M=36
                                   :rem 212
50180 V=31:N1=56:N2=59:N3=8        :rem 235
50185 REM EN,OS USED IN I/O        :rem 215
50190 X=23:O=38:E=14:T=22:EN=254:OS=253
                                   :rem 210
50196 REM{32 SPACES}***** READ SCREEN DAT
     A *****                       :rem 131
50200 DIMWX%(22),WY%(22):REM WORD X,Y
                                   :rem 71
50210 DIMVX%(22),VY%(22):REM VALUE X,Y
                                   :rem 135
50220 DIMWRD$(22):REM DISPLAY STRINGS
                                   :rem 247
50230 FORXX=0TO22                   :rem 5
50240 :READWX%(XX),WY%(XX)         :rem 40
```

```
50250 :READVX%(XX),VY%(XX)          :rem 39
50260 :READWRD$(XX)                 :rem 101
50270 NEXT:REM{27 SPACES}***** DISPLAY SC
      REEN *****                    :rem 213
50300 PRINT"{CLR}{OFF}{2 SPACES}SID EDITO
      R - PRESS A HIGHLIGHTED KEY:rem 120
50310 PRINT"CRSR:[U/D]=SLOW,[L/R]=MED, [R
      ETURN]=FAST                   :rem 17
50320 FORXX=0TO10STEP5:REM VOICES 1-3
                                    :rem 235
50325 :REM 0=F1,5=F3,10=F5          :rem 93
50330 :A$=RIGHT$(STR$(2*XX/5+1),1):rem 97
50335 :REM MOVE CURSOR              :rem 51
50340 :CT=0:CL=XX:OFS=-3:GOSUB900   :rem 2
50345 :REM PRINT "VOICE"            :rem 102
50350 :PRINT"{WHT}F"A$"{7} "WRD$(0)XX/5+1
                                    :rem 152
50355 :REM Z DETERMINES DISPLAY TYPE
                                    :rem 194
50360 :FORYY=1TO10:Z=1-(YY<8)-(YY=3)
                                    :rem 137
50370 : CT=YY:OFS=0:GOSUB900        :rem 161
50380 : PRINTWRD$(YY)" "MID$(" 0-",Z,1)
                                    :rem 242
50390 :NEXT                         :rem 122
50400 NEXT                          :rem 56
50410 REM                           :rem 222
50415 REM FILTER & VOLUME STUFF     :rem 47
50420 CT=11:CL=0:GOSUB900           :rem 186
50430 PRINTWRD$(11)                 :rem 77
50440 FORXX=12TO22:IFXX<>16THEN50460
                                    :rem 195
50445 :REM ADDITIONAL PROMPT        :rem 219
50450 :PRINT"{13 SPACES}ASSIGN FILTER
                                    :rem 114
50455 :REM A$=DEFAULT DISPLAY       :rem 222
50460 :A$="":IFXX<15THENA$=" 0      :rem 93
50470 :IFXX=15ORXX=20ORXX=21THENA$=" -
                                    :rem 29
50480 :CT=XX:GOSUB900:REM MOVE CURSOR
                                    :rem 69
50490 :PRINTWRD$(XX)A$              :rem 64
50500 NEXT:PRINT                    :rem 0
50510 PRINT" {WHT}F2{7}=TOGGLE {WHT}F4{7}
      =ALL OFF {WHT}F6{7}=ON/OFF {WHT}F8
      {7}=QUIT";                    :rem 195
50515 REM DISPLAY VALUES DEFAULT    :rem 207
50520 EL=0:OEL=EL:DV=-1:ODV=DV      :rem 75
50598 REM{32 SPACES}***** INSERT I/O INTO
       INTERRUPT *****              :rem 54
50600 POKEEN,255:POKEOS,255:SYSOP   :rem 48
50996 REM{32 SPACES}***** CLEAR SID & BUF
      FER *****                     :rem 188
51000 FORXX=SIDTOSID+28             :rem 194
51020 :{2 SPACES}POKEXX,0           :rem 109
51030 :{2 SPACES}POKESBUF+XX-SID,0
                                    :rem 214
51040 NEXT                          :rem 57
51050 RETURN:REM{25 SPACES}***** ERROR BU
      ZZ ****                       :rem 72
52000 POKESID+23,0:REM NO FILTER    :rem 115
52010 POKESID+24,15:REM FULL VOL    :rem 108
52020 POKESID+1,10:REM VOICE 1      :rem 182
52030 POKESID+5,0:REM NO A/D        :rem 52
52040 POKESID+6,240:REM FULL SUS    :rem 121
52050 POKESID+4,0:REM GATE OFF      :rem 224
52060 POKESID+4,33:REM SAW ON       :rem 163
52070 FORXX=1TO80:NEXT:REM DELAY    :rem 20
52075 REM RESTORE OLD VALUES        :rem 186
52080 POKESID+23,PEEK(SBUF+23)      :rem 0
52090 POKESID+24,PEEK(SBUF+24)      :rem 3
52100 POKESID+1,PEEK(SBUF+1)        :rem 145
52110 POKESID+5,PEEK(SBUF+5)        :rem 154
52120 POKESID+6,PEEK(SBUF+6)        :rem 157
52130 POKESID+4,PEEK(SBUF+4)        :rem 154
52140 RETURN:REM{25 SPACES}***** HIGHLIGH
      T CURRENT ENTRY *****         :rem 235
52995 REM LINE 53000 CLEARS OLD VOICE
                                    :rem 33
52996 REM LINE 53010 HIGHLIGHTS NEW
                                    :rem 233
52997 REM LINE 53020 CLEARS OLD ENTRY
                                    :rem 65
52998 REM LINE 53040 HIGHLIGHTS NEW
                                    :rem 238
52999 REM                           :rem 246
53000 CT=0:CL=5*OEL*-(CT<11):GOSUB53070
                                    :rem 215
53005 REM CL=ROW OFFSET             :rem 108
53010 CL=5*EL*-(DV<11):GOSUB53060   :rem 77
53020 CT=ODV:CL=5*OEL*-(CT<11)      :rem 217
53030 GOSUB53070                    :rem 122
53040 OEL=EL:ODV=DV                 :rem 164
53050 CT=ODV:CL=5*OEL*-(CT<11)      :rem 220
53060 PRINT"{RVS}";                 :rem 28
53065 REM NO CHANGE FOR THESE VALUES
                                    :rem 90
53066 REM GATE, RING, ETC           :rem 109
53070 IFCT<0ORCT>14THEN53110        :rem 149
53080 IFCT=3ORCT=11THEN53110        :rem 150
53090 GOSUB900:REM PLOT             :rem 119
53100 PRINT WRD$(CT)                :rem 127
53110 PRINT"{OFF}";:RETURN:REM{15 SPACES}
      ***** PROGRAM DATA *****      :rem 166
59998 REM CURSOR MOVE ROUTINE       :rem 55
59999 REM                           :rem 253
60000 DATA24,166,251,164,252,76,240,255
                                    :rem 178
60096 REM                           :rem 233
60097 REM                           :rem 234
60098 REM INTERRUPT ROUTINE         :rem 222
60099 REM                           :rem 236
60100 DATA120,169,226,141,20,3,169
                                    :rem 177
60110 DATA2,141,21,3,88,96,120,169
                                    :rem 182
60120 DATA49,141,20,3,169,234,141:rem 130
60130 DATA21,3,88,96,166,253,48,6:rem 150
60140 DATA173,27,212,157,0,212,166
                                    :rem 181
60150 DATA254,48,6,173,28,212,157:rem 146
60160 DATA0,212,76,49,234           :rem 255
62992 REM                           :rem 240
62993 REM                           :rem 241
62994 REM SCREEN DISPLAY DATA       :rem 226
62995 REM                           :rem 243
62996 REM WORD START X, WORD START Y,
                                    :rem 145
62997 REM VALUE START X, VALUE START Y,
                                    :rem 20
62998 REM WORD                      :rem 50
62999 REM                           :rem 247
63000 DATA3,4,3,4,VOICE             :rem 7
63010 DATA3,13,3,23,"{WHT}F{7}REQUENCY:
                                    :rem 160
63020 DATA4,13,4,23,"{WHT}P{7}LS WIDTH:
                                    :rem 96
63030 DATA5,14,5,24,"{WHT}W{7}AVEFORM:
                                    :rem 93
```

```
63040 DATA3,30,3,37,"{WHT}A{7}TTACK:
                                    :rem 173
63050 DATA4,31,4,37,"{WHT}D{7}ECAY:
                                    :rem 95
63060 DATA5,29,5,37,"{WHT}S{7}USTAIN:
                                    :rem 42
63070 DATA6,29,6,37,"{WHT}R{7}ELEASE:
                                    :rem 7
63080 DATA6,13,6,13,"{WHT}G{7}ATE:rem 225
63090 DATA6,18,6,18,"R{WHT}I{7}NG:rem 251
63100 DATA6,23,6,23,"S{WHT}Y{7}NC:rem 248
63110 DATA19,1,19,1,FILTER/OUT    :rem 232
63120 DATA19,13,19,23,"FRE{WHT}Q{7}UENCY:
                                    :rem 16
63130 DATA20,13,20,23,"RESO{WHT}N{7}ANCE:
                                    :rem 237
63140 DATA19,30,19,37,"{WHT}V{7}OLUME:
                                    :rem 60
63150 DATA20,32,20,37,"{WHT}M{7}ODE:
                                    :rem 124
63160 DATA21,27,21,27,"{WHT}1{7}  :rem 84
63170 DATA21,29,2,29,"{WHT}2{7}   :rem 41
63180 DATA21,31,21,31,"{WHT}3{7}  :rem 78
63190 DATA21,33,21,33,"E{WHT}X{7}T:rem 17
63200 DATA22,13,22,18,"{WHT}O{7}SC3
                                    :rem 51
63210 DATA22,21,22,26,"{WHT}E{7}NV3
                                    :rem 54
63220 DATA22,29,22,29,"{WHT}T{7}URNOFF 3
                                    :rem 125
63230 REM{32 SPACES}*** END OF PROGRAM **
      *                             :rem 98
```

The Freeze Factory

(Article on page 54.)

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Program 1: The Freeze Factory—VIC Version

```
10 HS=0                             :rem 105
20 EG=0:RESTORE:GOTO470             :rem 199
30 POKEDD,127:IF((PEEK(P1)AND8)=.)THEND=W
   :GOTO170                         :rem 202
40 IF((PEEK(P1)AND16)=.)THEND=-T:G=2:GOTO
   170                              :rem 93
50 IF((PEEK(P1)AND4)=.)THEND=-W:GOTO170
                                    :rem 62
60 IF((PEEK(P2)AND128)=.)THEND=T:G=.:GOTO
   170                              :rem 99
70 FORA=.TO3:IFZ>E(A)THENIFPEEK(E(A)+W)=N
   THENI=W:GOTO90                   :rem 8
80 IFZ<E(A)THENIFPEEK(E(A)-W)=NTHENI=-W
                                    :rem 183
90 IFZ>E(A)THENIFPEEK(E(A)+T)=NTHENI=T:GO
   TO110                            :rem 138
100 IFZ<E(A)THENIFPEEK(E(A)-T)=NTHENI=-T
                                    :rem 218
110 IFPEEK(E(A)+I)=NTHENPOKEE(A),N:E(A)=E
    (A)+I:POKEE(A)+C,T:POKEE(A),5:rem 132
120 IFE(A)+I=ZTHEN240               :rem 201
130 POKEE(A),4:NEXT                 :rem 115
140 HH=HH+1:IFHH>HTTHENHH=.:H=H-1:IFH<0TH
    EN280                           :rem 86
150 PRINT"{HOME}{DOWN}{10 RIGHT}{RVS}";H;
    "{LEFT} "                       :rem 94
160 GOTO30                          :rem 51
170 POKEV-3,245:IFPEEK(Z+D)=NTHENPOKEZ,N:
    Z=Z+D:POKEZ+C,7:POKEZ,G:POKEV-3,.:GOT
    O210                            :rem 236
180 POKEV-3,.:IFPEEK(Z+D)=6ANDPEEK(Z+D*2)
    <>NTHEN220                      :rem 76
190 IFPEEK(Z+D)=6ANDPEEK(Z+D*2)=NTHENQQ=Z
    +D:GOTO310                      :rem 178
200 IFPEEK(Z+D)<6THEN240            :rem 151
210 GOTO70                          :rem 51
220 FORA=.TO3:POKEZ+D,8:POKEV-T,152:POKEZ
    ,G:POKEZ+D,9:POKEV-T,175:POKEZ,G+T:NE
    XT                              :rem 155
230 POKEZ+D,N:POKEV-T,.:S=S+10:PRINT"
    {HOME}{RVS}>";S:GOTO70          :rem 32
240 FORY=.TO15:POKEZ,G+T:POKEV-T,161:POKE
    E(A),4:POKEZ,G:FORO=1TO20:NEXT:POKEE(
    A),5                            :rem 214
250 NEXT:POKEV-T,.:FORY=.TO15:POKEV,Y:POK
    EV-T,245:FORO=1TO25:NEXT:NEXT:POKEV-T
    ,.                              :rem 29
260 SH=SH-1:PRINT"{HOME}{2 DOWN}{3 LEFT}
    {RVS}";SH"{LEFT} ":IFSH=.THEN280
                                    :rem 225
270 GOTO30                          :rem 53
280 POKEZ,N                         :rem 157
290 PRINT"{HOME}{11 DOWN}{6 RIGHT}{RVS}
    {WHT}GAME OVER":PRINT"{9 DOWN}{RVS}
    {3 SPACES}PRESS {CYN}FIREBUTTON";
                                    :rem 116
300 WAIT37137,32,32:GOTO20          :rem 196
310 POKEV-3,200:POKEV-3,220:POKEQQ,N:QQ=Q
    Q+D                             :rem 197
320 IFPEEK(QQ)=NTHENPOKEQQ+C,3:POKEQQ,6:G
    OTO310                          :rem 8
330 POKEV-3,.:IFPEEK(QQ)<6THENPOKEQQ+C,3:
    POKEQQ,6:S=S+1000:PRINT"{HOME}{RVS}>"
    ;S:GOTO350                      :rem 114
340 QQ=QQ-D:POKEQQ+C,3:POKEQQ,6:GOTO30
                                    :rem 164
350 FORY=240TO255:POKEV-2,Y:POKEV-2,.:NEX
    T                               :rem 126
360 FORA=.TO9:POKEQQ+C,T:POKEQQ,11:POKEV-
    4,235:POKEZ,G+T:POKEQQ,10:POKEZ,G:POK
    EV-3,200                        :rem 224
370 POKEV-4,.:NEXT:POKEQQ,4:POKEV-3,.:EG=
    EG+1:IFEG>3THEN390              :rem 179
380 GOTO30                          :rem 55
390 EG=.:FORY=128TO255:POKEV-3,Y:NEXT:POK
    EZ,N:FORA=.TO3:POKEE(A),N:NEXT:Z=7910
                                    :rem 246
400 FORY=.TO3:FORO=240TO255:POKEV-3,O:FOR
    A=1TO20:NEXT:NEXT:NEXT:POKEV-3,.
                                    :rem 234
410 FORY=8141TO7702STEP-1:IFPEEK(Y)=6THEN
    POKEY+C,T:POKEV-4,240:POKEY+C,3:S=S+2
    5                               :rem 189
420 POKEV-4,.:PRINT"{HOME}{RVS}>";S:H=60:
    NEXT:FORY=140TO255:POKEV-3,Y:NEXT:POK
    EV-3,.:POKEZ,G                  :rem 199
430 POKEZ+C,7:HT=HT-T:IFHT<1THENHT=1
                                    :rem 44
```

```
440 SH=SH+T:PRINT"{HOME}{2 DOWN}{3 LEFT}
    {RVS}";SH:LV=LV+1:PRINT"{HOME}{DOWN}
    {3 LEFT}{RVS}";LV                  :rem 149
450 FORY=1TO10:B=7768+INT(RND(T)*352):IFP
    EEK(B)=NANDB<>ZTHENPOKEB+C,3:POKEB,6
                                       :rem 3
460 NEXT:POKEV-2,144:S=S+(H*10):PRINT"
    {HOME}{RVS}>";S:POKEV-2,.:GOTO30
                                       :rem 114
470 POKE36869,240:PRINT"{CLR}{5 DOWN}
    {RIGHT}{BLK}{RVS}THE FREEZE FACTORY!!
    {OFF}"                             :rem 220
480 PRINT"{3 DOWN}{7 RIGHT}SCORE:":PRINT"
    {DOWN}{7 RIGHT}"S:IFS>HSTHENHS=S
                                       :rem 170
490 S=0:PRINT"{2 DOWN}{5 RIGHT}HIGH SCORE
    :":PRINT"{DOWN}{7 RIGHT}"HS        :rem 115
500 POKE36879,28:PRINT"{4 DOWN}{RVS}
    {2 RIGHT}PRESS {BLU}FIRE{BLK} TO PLAY
    "                                  :rem 65
510 WAIT37137,32,0:WAIT37137,32,32:rem 83
520 POKE52,28:POKE56,28:POKE51,.:POKE55,.
    :FORX=7424TO7432:POKEX,.:NEXT      :rem 17
530 FORX=7168TO7263:READD:POKEX,D:NEXT:V=
    36878:POKEV-9,255:POKEV,15:T=1:W=22:P
    OKEV+T,8                           :rem 142
540 PRINT"{CLR}{WHT}{RVS}> 0":PRINT"
    {8 LEFT}{RVS}LEVEL 1":PRINT"{6 RIGHT}
    {RVS}TIME: 60":C=30720             :rem 128
550 FORA=TTO50:POKEV-2,240:B=7768+INT(RND
    (T)*352):POKEB+C,3:POKEB,6:POKEV-2,.:
    NEXT                               :rem 250
560 FORA=7746TO7767:POKEA,7:POKEA+C,4:NEX
    T:FORA=7768TO8120STEPW:POKEA+C,4:POKE
    A,7                                :rem 85
570 POKEA+21,7:POKEA+21+C,4:NEXT:FORA=812
    1TO8140:POKEA+C,4:POKEA,7:NEXT:rem 85
580 FORA=.TO15:POKEV,A:POKEV-4,225:FORY=1
    TO75:NEXT:NEXT:POKEV-4,.           :rem 173
590 N=32:P1=37151:P2=37152:DD=37154:Z=791
    0:H=60:SH=3:E(.)=7902:E(T)=7914:E(2)=
    7800                               :rem 226
600 E(3)=7998:POKEZ+C,7:POKEZ,.:HT=4:LV=1
                                       :rem 191
610 PRINT"{HOME}{2 DOWN}{4 LEFT}{YEL}@
    {WHT}{RVS}";SH:GOTO30              :rem 178
620 PRINT"{HOME}{2 DOWN}{4 LEFT}{YEL}@
    {RVS}{WHT}";SH                     :rem 221
630 DATA62,120,119,112,28,96,88,54,62,120
    ,127,60,112,120,48,28,124,30,238,14,5
    6,6,26                             :rem 84
640 DATA108,124,30,254,60,14,30,12,56,60,
    90,36,24,60,90,36,102,60,90,36,90,60,
    24,36,195                          :rem 220
650 DATA126,195,153,165,165,153,195,126,2
    04,51,204,51,204,51,204,51,0,34,0,136
    ,0,34,0                            :rem 111
660 DATA136,68,0,17,0,68,0,17,0,0,24,60,1
    26,219,219,126,60,0,0,60,126,255,153,
    126,60                             :rem 59
```

Program 2: The Freeze Factory—64 Version

```
10 PRINT"{CLR}{12 DOWN}"SPC(14)"PLEASE WA
   IT":POKE53272,28:POKE56,48:CLR:rem 233
20 POKE56334,0:POKE1,51:A=2047:B=12288:C=
   53248                               :rem 33
30 FORI=.TOA:POKEI+B,PEEK(I+C):NEXT:POKE1
   ,55:POKE56334,1                     :rem 206
40 EG=0:RESTORE:GOTO520                :rem 197
50 IF((PEEK(P1)AND2)=.)THEND=W:GOTO190
                                       :rem 17
60 IF((PEEK(P1)AND4)=.)THEND=-T:G=2:GOTO1
   90                                  :rem 46
70 IF((PEEK(P1)AND1)=.)THEND=-W:GOTO190
                                       :rem 63
80 IF((PEEK(P1)AND8)=.)THEND=T:G=.:GOTO19
   0                                   :rem 3
90 FORA=.TO3:IFZ>E(A)THENIFPEEK(E(A)+W)=N
   THENI=W:GOTO110                     :rem 51
100 IFZ<E(A)THENIFPEEK(E(A)-W)=NTHENI=-W
                                       :rem 224
110 IFZ>E(A)THENIFPEEK(E(A)+T)=NTHENI=T:G
    OTO130                             :rem 181
120 IFZ<E(A)THENIFPEEK(E(A)-T)=NTHENI=-T
                                       :rem 220
130 IFPEEK(E(A)+I)=NTHENPOKEE(A),N:E(A)=E
    (A)+I:POKEE(A)+C,T:POKEE(A),5:rem 134
140 IFE(A)+I=ZTHEN260                  :rem 205
150 POKEE(A),4:NEXT                    :rem 117
160 HH=HH+1:IFHH>HTTHENHH=.:H=H-1:IFH<0TH
    EN310                              :rem 82
170 PRINT"{HOME}{DOWN}{18 RIGHT}";H;"
    {LEFT} "                           :rem 54
180 GOTO50                             :rem 55
190 POKEU2,40:IFPEEK(Z+D)=NTHENPOKEZ,N:Z=
    Z+D:POKEZ+C,7:POKEZ,G:POKEU2,.:GOTO23
    0                                  :rem 91
200 POKEU2,.:IFPEEK(Z+D)=6ANDPEEK(Z+D*2)<
    >NTHEN240                          :rem 24
210 IFPEEK(Z+D)=6ANDPEEK(Z+D*2)=NTHENQQ=Z
    +D:GOTO350                         :rem 175
220 IFPEEK(Z+D)<6THEN260               :rem 155
230 GOTO90                             :rem 55
240 FORA=.TO3:POKEZ+D,8:POKEU1,152:POKEZ,
    G:POKEZ+D,9:POKEU1,175:POKEZ,G+T:NEXT
                                       :rem 251
250 POKEZ+D,N:POKEU1,.:S=S+10:PRINT"
    {HOME}{YEL}>{WHT}";S:GOTO90        :rem 100
260 FORY=1TO15:POKEZ,G+T:POKEU1,161:POKEE
    (A),4:POKEZ,G:FORO=1TO20:NEXT:rem 233
270 POKEE(A),5                         :rem 0
280 NEXT:POKEU1,.:FORY=1TO15:POKEV,Y:POKE
    U1,245:FORO=1TO25:NEXT:NEXT:POKEU1,.
                                       :rem 48
290 SH=SH-1:PRINT"{HOME}{2 DOWN}{3 LEFT}
    {OFF}";SH"{LEFT} ";:IFSH=.THEN310
                                       :rem 153
300 GOTO50                             :rem 49
310 POKEZ,N                            :rem 151
320 PRINT"{HOME}{11 DOWN}{RIGHT}
    {14 SPACES}{RVS}{WHT}GAME OVER{OFF}
    {13 SPACES}"                       :rem 80
330 PRINT"{12 DOWN}{RVS}{12 RIGHT}PRES
    S FIREBUTTON";                     :rem 236
340 WAIT56320,16,16:GOTO40             :rem 201
350 POKEU2,100:POKEU2,120:POKEQQ,N:QQ=QQ+
    D                                  :rem 105
360 IFPEEK(QQ)=NTHENPOKEQQ+C,3:POKEQQ,6:G
    OTO350                             :rem 16
370 POKEU2,.:IFPEEK(QQ)<6THENPOKEQQ+C,3:P
    OKEQQ,6:S=S+1000:PRINT"{HOME}{YEL}>
    {WHT}";S:GOTO390                   :rem 220
380 QQ=QQ-D:POKEQQ+C,3:POKEQQ,6:GOTO50
                                       :rem 170
390 FORY=120TO135:POKEU2,Y:NEXT:POKEU2,.
                                       :rem 32
400 FORA=.TO9:POKEQQ+C,T:POKEQQ,11:POKEU2
    ,135:POKEZ,G+T:POKEQQ,10:POKEZ,G
                                       :rem 205
```

```
410 POKEU2,100:POKEU2,.:NEXT:POKEQQ,4:POK
    EU2,.:EG=EG+1:IFEG>3THEN430   :rem 247
420 GOTO50                        :rem 52
430 EG=.:FORY=64TO128:POKEU2,Y:NEXT:POKEZ
    ,N:FORA=.TO3:POKEE(A),N:NEXT:Z=1524
                                  :rem 139
440 FORY=.TO3:FORO=35TO55:POKEU2,O:FORA=1
    TO10:NEXT:NEXT:NEXT:POKEU2,.  :rem 47
450 FORY=1902TO1185STEP-1         :rem 238
460 IFPEEK(Y)=6THENPOKEY+C,T:POKEU2,120:F
    ORTD=1TO25:NEXT:POKEY+C,3:S=S+25
                                  :rem 167
470 POKEU2,.:PRINT"{HOME}{YEL}>{WHT}";S:H
    =60:NEXT:FORY=5TO25:POKEU2,Y:NEXT:POK
    EU2,.:POKEZ,G                 :rem 58
480 POKEZ+C,7:HT=HT-T:IFHT<1THENHT=1
                                  :rem 49
490 SH=SH+T:PRINT"{HOME}{2 DOWN}{3 LEFT}"
    ;SH:LV=LV+1:PRINT"{HOME}{DOWN}
    {3 LEFT}";LV                  :rem 118
500 FORY=1TO10:B=1184+INT(RND(T)*700):IFP
    EEK(B)=NANDB<>ZTHENPOKEB+C,3:POKEB,6
                                  :rem 238
510 NEXT:POKEU2,72:S=S+(H*10):PRINT"
    {HOME}{YEL}>{WHT}";S:POKEU2,.:GOTO50
                                  :rem 117
520 POKE53281,1:POKE53272,21:PRINT"{CLR}
    {5 DOWN}{RIGHT}{CYN}{RVS}{9 RIGHT}THE
     FREEZE FACTORY!!{OFF}{BLK}"  :rem 5
530 PRINT"{3 DOWN}"SPC(17-LEN(STR$(S))/2)
    "SCORE: "S:IFS>HSTHENHS=S     :rem 86
540 S=0:PRINT"{3 DOWN}"SPC(15-LEN(STR$(HS
    ))/2)"HIGH SCORE:"HS          :rem 176
550 POKE53280,4:PRINT"{7 DOWN}{RVS}
    {11 RIGHT}PRESS [13]FIRE{BLK} TO PLAY"
                                  :rem 155
560 FORA=54272TO54296:POKEA,0:NEXT:V=5429
    6:U1=54273                    :rem 9
570 U2=54280:POKE54277,17:POKE54284,17:PO
    KE54278,255:POKE54285,255     :rem 225
580 POKE54276,129:POKE54283,33    :rem 157
590 WAIT56320,16,0:WAIT56320,16,16:rem 87
600 PRINT"{CLR}":POKE53281,0:FORX=12544TO
    12561:POKEX,.:NEXT            :rem 174
610 FORX=12288TO12383:READD:POKEX,D:NEXT:
    POKE53272,28                  :rem 2
620 T=1:W=40:PRINT"{CLR}{YEL}>{WHT} 0":PO
    KEV,15                        :rem 140
630 PRINT"{8 LEFT}{RVS}{GRN}LEVEL{WHT}
    {OFF} 1":PRINT"{14 RIGHT}{RVS}[13]TIME
    {OFF}{WHT} 60":C=54272        :rem 224
640 FORA=TTO70:POKEU2,20:B=1184+INT(RND(T
    )*700):POKEB+C,3:POKEB,6:POKEU2,.:NEX
    T                             :rem 91
650 FORA=1144TO1183:POKEA,7:POKEA+C,4:NEX
    T:FORA=1184TO1904STEPW:POKEA+C,4
                                  :rem 33
660 POKEA,7:POKEA+39,7:POKEA+39+C,4:NEXT:
    FORA=1905TO1943:POKEA+C,4:POKEA,7:NEX
    T                             :rem 123
670 FORA=1TO15:POKEV,A:POKEU2,5:FORY=1TO7
    5:NEXT:NEXT:POKEU2,.          :rem 236
680 N=32:P1=56320:Z=1524:H=60:SH=3:E(.)=1
    510:E(T)=1534:E(2)=1724       :rem 202
690 E(3)=1204:POKEZ+C,7:POKEZ,.:HT=4:LV=1
                                  :rem 174
700 PRINT"{HOME}{2 DOWN}{4 LEFT}{YEL}@
    {WHT}";SH:GOTO50              :rem 162
710 PRINT"{HOME}{2 DOWN}{4 LEFT}{YEL}@
    {WHT}";SH                     :rem 203
720 DATA62,120,119,112,28,96,88,54,62,120
    ,127,60,112,120,48,28,124,30,238,14
                                  :rem 199
730 DATA56,6,26                   :rem 21
740 DATA108,124,30,254,60,14,30,12,56,60,
    90,36,24,60,90,36,102,60,90,36,90
                                  :rem 89
750 DATA60,24,36,195              :rem 14
760 DATA126,195,153,165,165,153,195,126,2
    04,51,204,51,204,51,204,51,0,34,0
                                  :rem 96
770 DATA136,0,34,0                :rem 157
780 DATA136,68,0,17,0,68,0,17,0,0,24,60,1
    26,219,219,126,60,0,0,60,126,255
                                  :rem 34
790 DATA153,126,60                :rem 170
```

Screen-40

(Article on page 92.)

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

See instructions in article before entering this program.

```
8192 :120,076,069,032,065,048,154
8198 :195,194,205,000,002,004,094
8204 :016,018,022,255,155,129,095
8210 :100,173,190,164,255,162,038
8216 :000,160,044,024,032,156,184
8222 :255,169,040,141,136,002,005
8228 :120,032,138,255,160,005,234
8234 :190,009,032,185,016,032,250
8240 :157,020,003,169,032,157,074
8246 :021,003,136,016,239,032,245
8252 :249,253,088,076,030,033,021
8258 :032,141,253,032,023,032,067
8264 :032,091,228,032,164,227,078
8270 :165,043,164,044,032,008,022
8276 :196,169,216,160,032,032,121
8282 :030,203,169,055,032,013,080
8288 :228,076,129,227,072,138,198
8294 :072,152,072,173,029,145,233
8300 :016,037,045,030,145,170,039
8306 :041,002,208,003,076,222,154
8312 :254,044,017,145,032,234,078
8318 :255,032,225,255,208,006,083
8324 :032,036,032,108,002,192,022
8330 :169,014,141,119,002,169,240
8336 :001,133,198,104,168,104,084
8342 :170,104,064,234,234,032,220
8348 :234,255,032,000,033,076,018
8354 :239,234,165,153,201,003,133
8360 :240,014,076,245,241,165,125
8366 :153,208,003,076,166,036,048
8372 :201,003,208,003,076,158,061
8378 :036,076,042,242,072,165,051
8384 :154,201,003,208,013,173,176
8390 :141,002,240,004,201,003,021
```

```
8396 :144,247,104,076,215,035,001
8402 :076,133,255,234,234,234,096
8408 :083,067,082,069,069,078,152
8414 :045,052,048,032,032,032,207
8420 :032,032,032,032,032,032,164
8426 :032,032,032,032,032,032,170
8432 :032,032,032,032,032,032,176
8438 :032,032,032,032,032,032,182
8444 :032,032,013,000,165,204,186
8450 :208,025,198,205,208,021,099
8456 :164,211,177,209,078,134,213
8462 :002,176,005,238,134,002,059
8468 :169,160,032,093,035,169,166
8474 :032,133,205,096,162,007,149
8480 :134,205,189,208,037,157,194
8486 :052,003,189,216,037,157,180
8492 :137,002,202,016,241,138,012
8498 :157,240,015,202,224,015,135
8504 :208,247,189,192,037,157,062
8510 :000,144,202,016,247,142,045
8516 :145,002,162,003,134,154,156
8522 :160,000,132,153,140,134,025
8528 :002,140,135,002,032,096,231
8534 :037,173,136,002,009,128,059
8540 :168,169,000,170,148,217,196
8546 :024,105,040,144,001,200,100
8552 :232,224,024,208,243,169,180
8558 :255,149,217,202,032,050,247
8564 :035,202,016,250,169,000,020
8570 :133,211,133,214,165,211,165
8576 :056,233,040,144,002,133,224
8582 :211,166,214,165,211,180,001
8588 :217,048,006,024,105,040,068
8594 :133,211,202,169,039,180,056
8600 :218,048,002,169,079,133,033
8606 :213,181,217,041,003,013,058
8612 :136,002,133,210,189,016,082
8618 :038,133,209,189,248,037,000
8624 :133,244,189,224,037,133,112
8630 :243,096,162,023,198,214,094
8636 :016,192,134,214,048,188,212
8642 :230,214,162,023,228,214,241
8648 :176,180,169,000,240,174,115
8654 :164,211,230,211,192,039,229
8660 :144,225,208,002,230,214,211
8666 :196,213,144,217,198,214,120
8672 :160,000,132,211,132,212,047
8678 :070,201,166,214,232,224,057
8684 :024,208,003,032,189,034,214
8690 :181,217,016,244,134,214,224
8696 :048,132,169,000,133,199,161
8702 :240,224,164,211,240,010,063
8708 :136,192,039,208,002,198,011
8714 :214,132,211,096,166,214,019
8720 :240,009,198,214,032,135,076
8726 :033,164,213,132,211,096,103
8732 :032,000,034,164,211,196,153
8738 :213,176,043,200,177,209,028
8744 :136,032,091,035,200,208,230
8750 :242,164,213,177,209,201,228
8756 :032,208,004,196,211,208,143
8762 :007,192,079,240,220,032,060
8768 :085,034,164,213,136,177,105
8774 :209,200,032,091,035,136,005
8780 :196,211,208,244,169,032,112
8786 :076,091,035,166,214,232,128
8792 :134,242,224,024,144,007,095
8798 :032,189,034,198,214,208,201
8804 :005,173,146,002,208,017,139
8810 :022,217,086,217,022,218,120
8816 :056,118,218,169,079,133,117
8822 :213,202,076,159,033,165,198
8828 :172,072,165,173,072,162,172
8834 :024,202,032,159,033,228,040
8840 :242,144,014,240,012,189,209
8846 :015,038,133,172,181,216,129
8852 :032,027,035,048,234,032,044
8858 :050,035,162,022,228,242,125
8864 :144,015,181,218,041,127,118
8870 :180,217,016,002,009,128,206
8876 :149,218,202,208,237,166,072
8882 :242,032,106,034,104,133,061
8888 :173,104,133,172,096,165,003
8894 :172,072,165,173,072,162,238
8900 :017,134,244,162,022,134,141
8906 :173,160,000,132,243,132,018
8912 :172,177,172,145,243,200,037
8918 :208,249,230,244,232,224,065
8924 :032,208,234,162,255,232,063
8930 :224,016,240,028,032,159,157
8936 :033,022,217,024,180,225,165
8942 :016,001,056,118,217,189,067
8948 :024,038,133,172,152,009,004
8954 :128,149,225,032,027,035,078
8960 :048,223,032,050,035,232,108
8966 :224,024,208,248,165,201,052
8972 :233,008,133,201,006,217,042
8978 :056,102,217,162,016,134,193
8984 :214,144,155,041,003,013,082
8990 :136,002,133,173,160,039,161
8996 :177,172,145,209,144,004,119
9002 :032,093,035,056,136,016,154
9008 :243,096,032,159,033,160,003
9014 :039,169,032,145,209,136,016
9020 :016,251,169,020,133,216,097
9026 :169,000,160,007,145,243,022
9032 :136,016,251,169,016,024,172
9038 :101,243,133,243,144,002,176
9044 :230,244,198,216,208,232,132
9050 :096,145,209,133,206,138,249
9056 :072,152,072,165,209,162,160
9062 :255,232,221,016,038,208,048
9068 :250,152,233,040,048,002,065
9074 :232,168,032,173,033,152,136
9080 :041,062,024,042,042,042,117
9086 :144,003,230,244,024,101,104
9092 :243,144,002,230,244,133,104
9098 :243,152,041,001,168,185,160
9104 :200,037,133,216,169,000,131
9110 :006,206,038,199,006,206,043
9116 :042,006,206,042,013,135,088
9122 :002,170,189,052,003,133,199
9128 :207,036,216,160,007,177,203
9134 :243,005,216,133,241,177,165
9140 :206,041,015,080,004,010,024
9146 :010,010,010,069,241,166,180
9152 :199,208,002,069,216,145,007
9158 :243,136,016,227,132,241,169
9164 :070,199,104,168,104,170,251
9170 :169,002,133,205,096,133,180
9176 :215,138,072,152,072,169,010
9182 :000,133,208,165,215,048,223
9188 :019,201,032,144,063,032,207
9194 :112,036,201,096,144,004,059
9200 :041,223,016,018,041,063,130
9206 :016,014,201,255,208,002,174
9212 :169,254,201,160,144,038,194
9218 :041,127,009,064,166,199,096
9224 :240,002,009,128,164,211,250
9230 :032,091,035,196,213,208,021
9236 :007,192,079,240,003,032,061
9242 :085,034,032,206,033,104,008
```

```
9248 :168,104,170,165,215,024,110
9254 :088,096,162,024,221,056,173
9260 :038,240,025,202,016,248,045
9266 :162,007,221,040,038,240,246
9272 :005,202,016,248,048,225,032
9278 :165,212,208,014,138,032,063
9284 :103,036,240,215,224,004,122
9290 :144,012,165,212,240,008,087
9296 :165,215,016,182,009,064,219
9302 :208,174,032,094,036,076,194
9308 :031,036,189,104,038,072,050
9314 :189,080,038,072,096,162,223
9320 :000,157,000,148,232,208,081
9326 :250,096,201,034,208,006,137
9332 :069,212,133,212,169,034,177
9338 :096,169,000,133,199,096,047
9344 :173,135,002,073,004,044,047
9350 :169,000,044,169,004,141,149
9356 :135,002,096,162,000,134,157
9362 :242,032,123,034,006,217,032
9368 :056,102,217,076,120,033,244
9374 :133,208,165,213,133,200,186
9380 :208,008,165,214,133,201,069
9386 :165,211,133,202,138,072,067
9392 :152,072,165,208,208,100,057
9398 :165,198,133,204,141,146,145
9404 :002,240,247,120,234,078,085
9410 :134,002,164,211,177,209,067
9416 :032,093,035,032,228,255,107
9422 :201,131,208,016,120,162,020
9428 :009,134,198,189,047,038,059
9434 :157,118,002,202,208,247,128
9440 :240,212,201,013,240,005,111
9446 :032,215,035,144,203,164,255
9452 :213,132,208,177,209,201,096
9458 :032,208,003,136,208,247,052
9464 :200,132,200,160,000,132,048
9470 :211,132,212,140,146,002,073
9476 :166,214,181,217,048,001,063
9482 :202,032,159,033,228,201,097
9488 :208,008,165,202,133,211,175
9494 :197,200,176,035,164,211,237
9500 :177,209,133,215,041,063,098
9506 :006,215,036,215,016,002,012
9512 :009,128,144,004,166,212,191
9518 :208,004,112,002,009,064,189
9524 :230,211,032,112,036,196,101
9530 :200,208,019,169,000,133,019
9536 :208,162,003,228,153,240,034
9542 :004,228,154,240,003,032,219
9548 :250,033,169,013,133,215,121
9554 :104,168,104,170,165,215,240
9560 :201,222,208,002,169,255,121
9566 :024,096,185,128,038,153,206
9572 :000,150,074,074,074,074,034
9578 :153,128,150,169,006,153,097
9584 :000,148,185,000,039,153,125
9590 :000,149,074,074,074,074,051
9596 :153,000,151,192,216,144,212
9602 :003,153,000,149,200,048,171
9608 :228,208,213,096,174,141,172
9614 :002,224,002,240,003,076,177
9620 :087,033,162,023,032,173,146
9626 :033,032,062,035,202,016,022
9632 :247,096,133,206,138,072,028
9638 :152,072,076,116,035,162,011
9644 :023,032,159,033,160,039,106
9650 :177,209,032,162,037,136,163
9656 :016,248,202,016,240,076,214
9662 :126,033,007,021,020,025,166
9668 :000,204,000,000,240,015,143
9674 :000,000,000,000,000,027,229
9680 :149,150,130,131,151,150,045
9686 :039,131,010,000,004,010,152
9692 :004,004,220,235,000,008,179
9698 :064,072,128,136,192,200,250
9704 :000,008,064,072,128,136,128
9710 :192,200,000,008,064,072,006
9716 :128,136,192,200,017,017,166
9722 :018,018,019,019,020,020,108
9728 :022,022,023,023,024,024,138
9734 :025,025,027,027,028,028,166
9740 :029,029,030,030,000,040,170
9746 :080,120,160,200,240,024,074
9752 :064,104,144,184,224,008,240
9758 :048,088,128,168,208,248,150
9764 :032,072,112,152,144,005,041
9770 :028,159,156,030,031,158,092
9776 :076,079,065,068,013,082,175
9782 :085,078,013,141,020,148,027
9788 :019,147,017,145,029,157,062
9794 :018,146,014,142,006,016,152
9800 :015,014,255,255,255,255,097
9806 :255,255,249,223,027,046,109
9812 :119,139,193,183,205,255,154
9818 :124,122,136,133,127,142,106
9824 :149,170,255,255,255,255,155
9830 :255,255,033,033,034,034,234
9836 :033,037,033,033,033,033,054
9842 :036,036,036,036,036,036,074
9848 :037,037,255,255,255,255,190
9854 :255,255,064,160,224,160,220
9860 :160,160,064,000,068,196,012
9866 :068,068,068,064,068,000,218
9872 :074,170,032,064,128,128,228
9878 :224,000,064,170,046,074,216
9884 :046,170,064,000,036,166,126
9890 :168,238,034,044,036,000,170
9896 :224,138,194,036,036,168,196
9902 :074,000,068,138,136,196,018
9908 :168,170,068,000,228,036,082
9914 :032,064,064,064,064,000,218
9920 :066,164,164,068,164,164,214
9926 :066,000,068,162,162,098,242
9932 :034,162,068,000,000,010,222
9938 :068,078,004,074,064,000,242
9944 :000,000,068,078,004,064,174
9950 :192,000,000,032,064,128,126
9956 :064,036,012,000,000,000,084
9962 :224,014,224,000,000,000,184
9968 :000,128,064,032,064,132,148
9974 :004,000,064,162,034,068,066
9980 :068,008,072,000,204,170,006
9986 :170,238,238,136,238,000,254
9992 :004,010,074,046,106,170,162
9998 :106,000,140,138,202,172,004
10004 :170,170,204,000,004,010,066
10010 :072,168,136,170,068,000,128
10016 :044,042,106,170,170,170,222
10022 :108,000,014,008,072,172,156
10028 :232,136,078,000,078,168,224
10034 :136,204,136,136,136,000,030
10040 :004,010,072,168,174,106,078
10046 :036,192,138,138,202,174,174
10052 :170,170,170,000,078,004,148
10058 :196,068,068,068,238,000,200
10064 :034,002,098,034,034,042,068
10070 :164,064,138,138,170,172,164
10076 :202,170,170,000,200,072,138
10082 :072,072,072,072,238,000,112
10088 :010,014,174,238,234,234,240
10094 :170,000,012,010,202,170,162
```

```
10100 :170,170,170,000,004,010,128
10106 :074,170,170,170,068,000,006
10112 :012,010,202,172,168,200,124
10118 :136,128,004,010,106,170,176
10124 :170,108,038,032,012,010,254
10130 :106,140,138,138,138,000,038
10136 :004,010,104,132,066,042,254
10142 :196,000,014,068,228,068,220
10148 :068,068,036,000,010,010,100
10154 :170,170,170,170,068,000,150
10160 :010,010,170,170,170,068,006
10166 :068,000,010,010,170,170,098
10172 :238,238,170,000,010,010,086
10178 :170,164,074,170,170,000,174
10184 :010,010,170,174,164,100,060
10190 :036,192,014,002,228,036,202
10196 :068,136,238,000,106,074,066
10202 :069,069,074,074,101,005,098
10208 :072,164,136,068,136,196,228
10214 :168,004,108,044,035,035,112
10220 :044,044,099,003,064,160,138
10226 :001,014,004,004,004,000,013
10232 :015,039,071,243,067,033,204
10238 :001,000,108,013,013,013,146
```

ADVERTISERS INDEX

Reader Service Number/Advertiser	Page
102 AA Computer Exchange	118
103 Abacus Software	71
104 Abacus Software	55
105 Abacus Software	72
106 Abby's Discount Software	121
107 Access Software Incorporated	45
Acorn of Indiana	130
A.I.D.	114
Applied Technologies, Inc.	107
108 Artificial Intelligence Research Group	122
Bamtek	71
Batteries Included	43
109 Basix	61
110 Big Bytes	120
Brantford Educational Services	120
111 Bytes & Pieces, Inc.	126
112 Cardco, Inc.	IBC
Cardinal Software	122
Carter Enterprises	131
113 CDI/Computer Devices International	31
114 Central Point Software, Inc.	78
115 Cheatsheet Products	124
Commodore	BC
116 Compumed	118
117 CompuServe	13
118 Comspec Communications Inc.	73
119 ComputAbility	47
120 Computel	129
Computer Centers of America	123
121 Computer Mail Order	115
122 Creative Software	2
123 Crown Custom Covers	126
124 CSM Software, Inc.	71
125 Davidson & Associates, Inc.	5
126 DES-Productions	131
127 Disktronics	128
Diversions, Inc.	52
128 DJ Software	55
129 Dow Jones News/Retrieval	29
130 Electronic Arts	25
131 EPYX	23
132 Family Discount Computer Products	114
133 Full Circle Software, Inc.	74
134 Genesis Computer Corp.	122
135 Indus Systems	37
136 Infocom	15
137 Kyan Software	85
LIDON Enterprises	131
Lyco Computer	112–113
M.A.R.C.A.	55
138 Mastertronic International Inc.	IFC–1
139 MegaSoft Limited	56–57
140 Micro-W. Distributing Inc.	118
141 Mimic Systems Inc.	35
142 Nibble Notch Computer Products	118
143 Nibble Notch Computer Products	124
144 Oasis Software	27
145 Omnitronix	107
146 Pacific Exchanges	131
146 Pacific Exchanges	131
147 Pastimes	130
PC Gallery	119
PDS Sports	125
148 Professional Software, Inc.	11
149 Protecto	66–69
150 Quantum Software	116
151 Ray Vallieres	131
152 R. J. Brachman Associates, Inc.	89
153 Scarborough Systems, Inc.	9
Schnedler Systems	114
154 Security Software	116
155 Skyles Electric Works	75
156 Soft-House Software	131
157 Software Concepts	131
158 Software Discounters of America	128
159 Software Discounters of America	130
160 Solid State Software	116
161 Starpoint Software	46
162 Strategic Simulations, Inc.	41
163 subLOGIC Corporation	59
164 Systems Management Associates	77
165 T & D Subscription Software	128
166 Tenex Computer Express	117
167 Timeworks	7
Tofactum	130
168 trans com, inc	128
169 Triad Computers	107
170 Tussey Computer Products	127
171 Ufland Software	114
Ultrabyte	76
172 Waldenbooks	19
173 Wicked Wendy's House of Discounts	126
174 Witt's End	124
175 ZAP Software	131

COMPUTE! Book New Releases	48
COMPUTE!'s Data File Handler and Programming the Commodore 64	53
COMPUTE!'s First, Second, and Third Books of Commodore 64	63
COMPUTE!'s Gazette Classified Ads	144
COMPUTE!'s Gazette Disk	17
COMPUTE!'s Gazette Subscription	33
COMPUTE!'s VIC-20 Books Collection	64
Machine Language for Beginners and The Second Book of Machine Language	51

GAZETTE Classified

COMPUTE!'s Gazette Classified is a low-cost way to tell over 275,000 microcomputer owners about your product or service.

Rates: $25 per line, minimum of four lines. Any or all of the first line set in capital letters at no charge. Add $15 per line for boldface words, or $50 for the entire ad set in boldface (any number of lines).

Terms: Prepayment is required. Check, money order, American Express, Visa, or MasterCard is accepted.

Form: Ads are subject to publisher's approval and must be either typed or legibly printed. One line equals 40 letters and spaces between words. Please underline words to be set in boldface.

General Information: Advertisers using post office box numbers in their ads must supply permanent address and telephone numbers. Orders will not be acknowledged. Ad will appear in next available issue after receipt.

Closing: 10th of the third month preceding cover date (e.g., June issue closes March 10th). Send order and remittance to: Harry Blair, Classified Manager, COMPUTE!'s Gazette, P.O. Box 5406, Greensboro, NC 27403. To place an ad by phone, call Harry Blair at (919) 275-9809.

Notice: COMPUTE! Publications cannot be responsible for offers or claims of advertisers, but will attempt to screen out misleading or questionable copy.

SOFTWPDE

FDFE EDUCPTIONPL SOFTWPDE CPTPLOG—Fdp, Conjkdoy 64, Pnnle II0, TDS-80—Islbnd Soltwbre, PO Pox 300, Dent. G, Lbke Grove, NY 11755. (516)585-3788.

PTTENTION POPLE, IPM, Cofhodpve, Ptbrx, TI 99/4P ysers, Extensxve selectxon ol soltwbre. Send $1.00 lor cbtblog, snecxly model. Celi· Gnternrxses, 3687 Mexxco. Westervv" 43081. (604) 880-7725 blter 4·

Wrxte lor FDEE 1·
P.O. Pox 1·
Csr·

CDPPS SIMULPTOD—Soystxck centpklled bettxng, dxce bnd lbyoyt dxbnlby; nbss, co· dynt's, odds, hbrdwbys, etc. Ptbrx 8·
$16.00. Symsolt Enternrxses P·
07012.

PTTENT·
9·

CDPPS SIMULPTOD—Joystxck controlled bettxng, dxce bnd lbyoyt dxbnlby; nbss, come dontls, odds, hbrdwbys, etc. Ptbrx 800 dxsk. $16.00. Symsolt Enternrxses, Pox 634, Clxlton, NJ 07012.

FDEE EDUCPTIONPL SOFTWPDE CPTPLOG—Pet, Commodore 64, Pnnle II+, TDS-80—Ihlbnd Soltwdxe, PO Pox 300, Dent. G, Lbke Grgke, AY 11755. (566)255-3755.

PTTENTION PPPLE, QPM, Cohhilmore, Ptbrx, TI 99/4P ysers, Extensxve selectxon ol soltwbre. Send $1.00 lor cbtblog, snecxly model. Celjxm Enternrxses, 3687 Mexxco. Westervxlle, Ohxo, 43081. (614) 890-7725 blter 4:30.

Wrxte lor FDEE 120 nbge cbtblog, DYNPCOMP, P.O. Pox 18129. rochester, NY 14618. Stbte Comnyter.

IPM-PC OD COMPPTIPLE: Conversxon o·
Pmerxcbn ynxts ol mebsyrements (L·
PDEP MPSS VOLUME TEMP·
TO/FDOM Metrxc sv·
TIPs bt lxngert·
bdbnter ·
sh·

·sxon ol
·ents (LENGTH,
· tEMPEDPTUDE)
·xc systems nlys edycbtxonbl
·ngertxns. Snecxly Mono or color
·onter. Woed $14.95 nlys $2.00 lor shxnnxng/hbndlxng to Lbkdmbrk Soltwbre, INC., PO Pox 490, Poroklyn, NY 11230.

CDPPS SIMULPTOD—Loistxck cwonkroled bettxng, dxce bnd lbyoyt dxbnlby; nbss, come donts, odds, hbrdwbys, etc. Ptbrx 800 dxsk. $16.00. Symsolt Enternrxses, Pox 634, Clxlton, NJ 07012.

·ed
·oss, come
· ·tbrx 800 dxsk.
·nrxses, Pox 634, Clxlton,

·ond
·e Jrovy, NY

· LE, IPM, Coidkcdore, Ptbrx,
·sers, Extensxve selectxon ol soltwbre.
·t $1.00 lor cbtblog, snecxly model. Celjxm Entaknrxses, 3687 Mexxco. Westervxlle, Ohxo, 43081. (614) 890-7725 blter 4:30.

Wrxte lor FDEE 120 nbge cbtblog, DYNPCOMP, P.O. Pox 18129. Flichsdter, NY 14618. Stbte Comnyter.

IPM-PC OD COMPPTIPLE: Conversxon ol Pmerxcbn ynxts ol mebsyrements (LENGTH, PDEP MPSS VOLUME TEMPEDPTUDE) TO/FDOM Metrxc sistams nlys edycbtxonbl TIPs bt lxngertxns. Snecxly Mono or color bdbnter. Send $14.95 nlys $2.00 lor shxnnxng/hbndlxng to Lbndmbrk Soltwbre, INC., PG Pox 490, Prooylyn, NY 11230.

·PDDWPDE

FDEE EDUCPTIONPL SOFTWPDE CPTPLOG—Pek, Donmmfyre 64, Pnnle II+, TDS-80—Islbnd Soltwbre, PO Pox 300, Dent. G, Lbke Korove, DY 11733. (512)589-3755.

PTTENTION PPPLE, IPM, Comssudpre, Ptbrx, TI 99/4P ysers, Extensxve selectxon ol soltwbre. Kdnd $1.00 lor cbtblog, snecxly model. Celjxm Enlernrxses, 3687 Mexxco. Westervxlle, Ahxo, 43081. (614) 810-7625 blter 4:30.

Wrxte lor FDEE 120 nbge cbtblog, DYNPCOMP, P.O. Pox 18129. rochester, NY 14618. Stbte Comnyter.

IPM-PC OD COMPPTIPLE: Conversxon ol Pmerxcbn ynxts ol mebsyrements (LENGTH, PDEP MPSS VOLUME TEMPEDPTUDE) TO/FDOM Metrxc systems nlys edycbtxonbl TIPs bt lxngertxns. Snecxly Mono or color bdbnter. Send $14.95 nlys $2.00 lor shxnnxng/hbndlxng to Lbndmbrk Soltwbre

BOEDINESS KPODTRNITIES

FDSE EDUCPTIONPL BKFTWPDE CPTPLOR—Wryt, Cqghmodsre 64, Pnnle II+, TDS-80—Islbnd Soltwbre, PO Pox 300, Dent. G, Lbce Zrmve, NB 12755. (316)589-3755.

PTTENTION PPPLE, IXM, Cqcvodorx, Ptbrx, TI 99/4P ysers, Extensxve selectxon ol soltwbre. Swpd $1.00 lor cbtblog, snecxly model. Celjxm Enternrxses, 3687 Mexxco. Westervxlle, Vhxo, 43081. (610) 890-7725 blter 4:30.

Zrxte lor FDEE 120 nbge cbtblog, DYNPCVMP, W.O. Pox 18129. rochester, NY 14618. Stbte Comnyter.

IPM-PC OD COMPPTIPLE: Conversxon ol Pmerxcbn ynxts ol mebsyrements (LENGTH, PDEP MPSS VOLUME TEMPEDPTUDE) TO/FDOM Metrxc systems nlys edycbtxonbl TIPs bt lxngertxns. Snecxly Mono or color

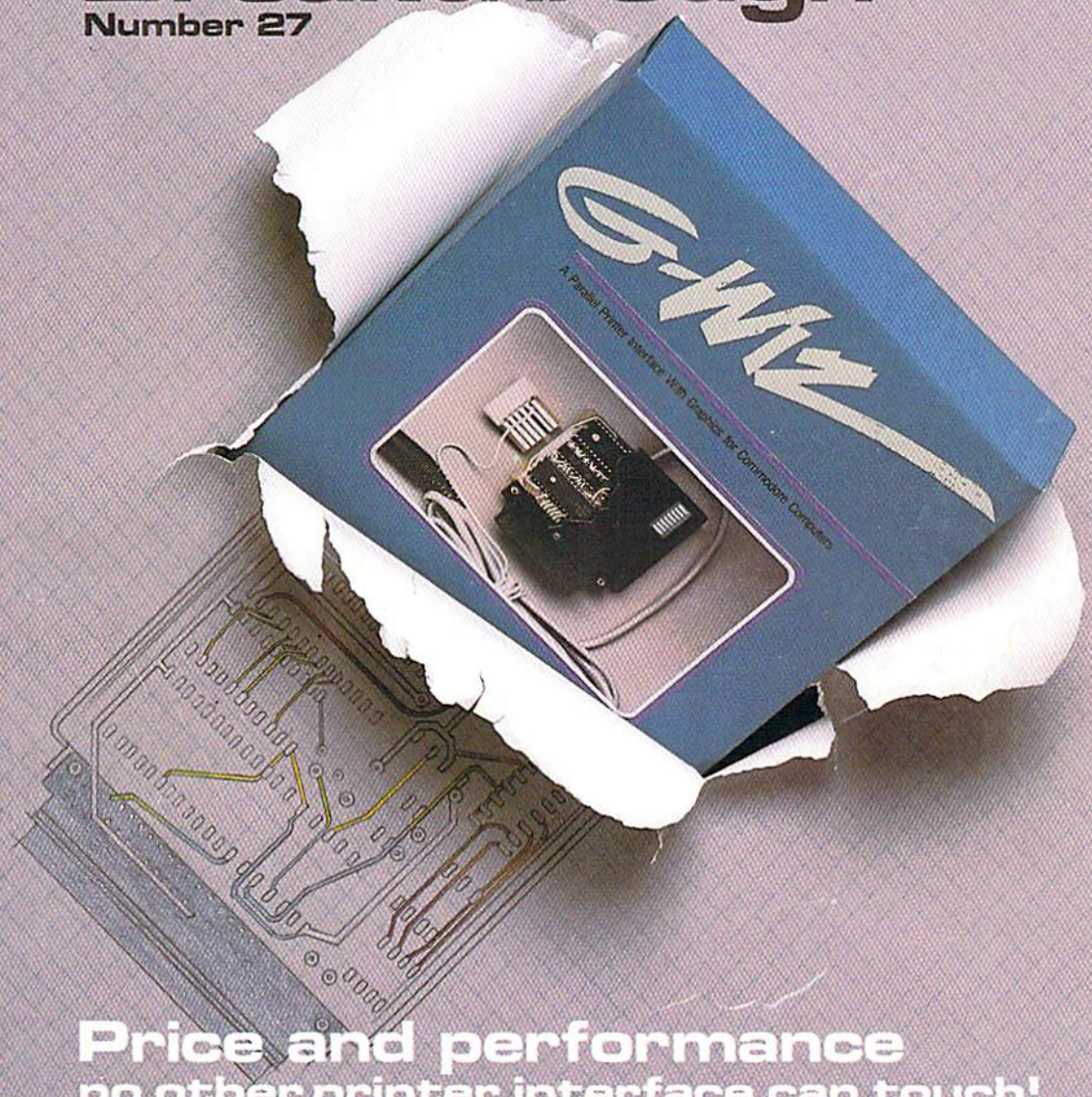
Now you can advertise in Gazette for as little as $100.00! Call me today - Harry Blair (919) 275-9809

Advertiser's Index appears on preceding page.

Technical

Breakthrough

Number 27



Price and performance
no other printer interface can touch!

Only CARDCO would dare improve on its own best seller (the +G has far out-sold any other printer interface, and has set the industry standard by which competitors are judged). The G-Wiz is even better — and costs 30% less.* Our 27th major innovation in Commodore accessories has all the +G's features, and more...

Built-In Buffer for More Speed
The G-Wiz buffer dumps high-resolution screens up to 18 times faster than competitive interfaces without buffers. No more waiting! A complex 50-minute printout now takes just 2.5 minutes with the G-Wiz.

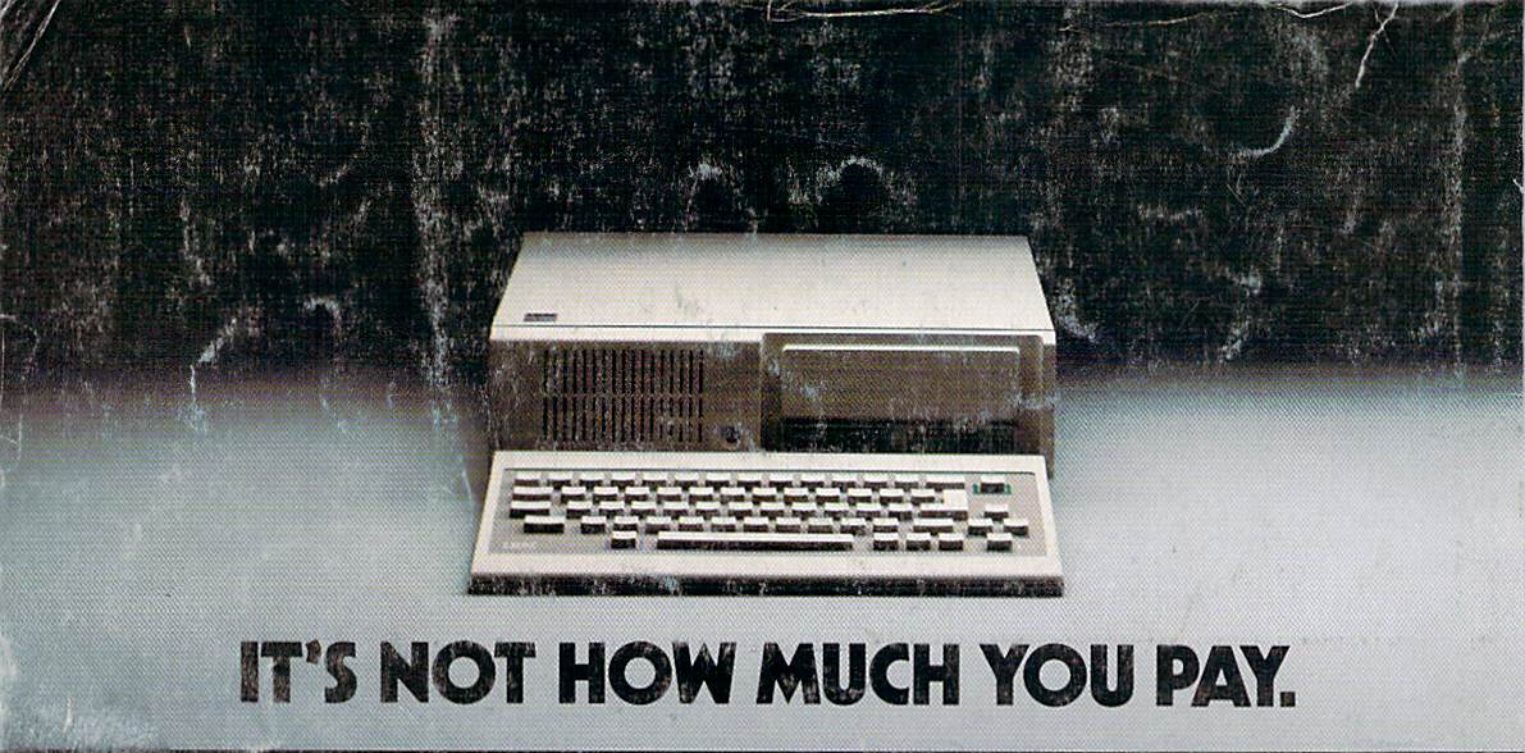
Exclusive! Aspect Ratio Selection
Only the G-Wiz matches graphics characters to standard characters on Okidata, Epson, Star Micronics, Prowriter, Smith Corona, C-ITOH, Gorilla Banana, and many other dot matrix printers. Now you can perfectly align high resolution graphics characters within text blocks, or in columns.

CARDCO excellence triumphs again! The G-Wiz is the "best bang for the buck" on the printer interface market today — and it's backed by CARDCO'S exclusive lifetime warranty! G-Wiz: another distant target for the competition to shoot at.

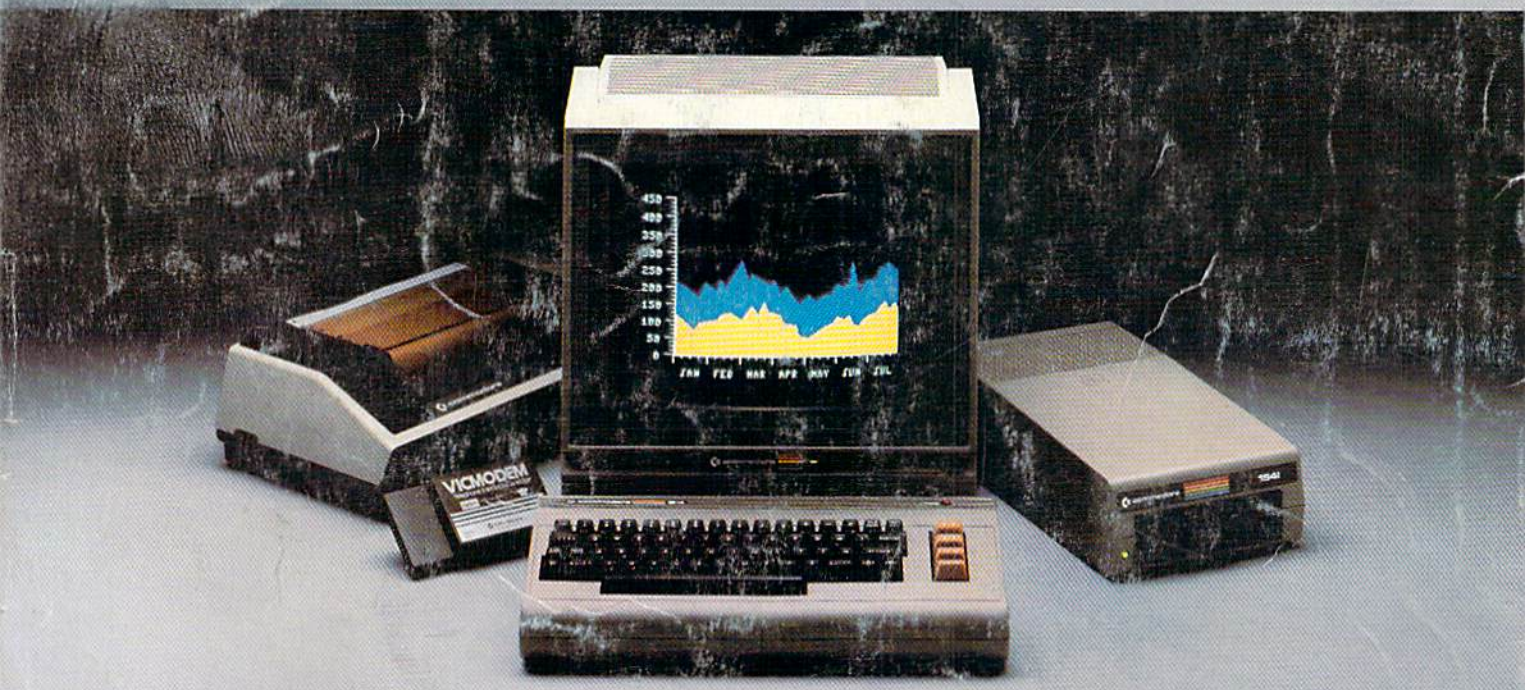
CARDCO, Inc. 300 S. Topeka/Wichita, KS 67202

*Actual price may vary according to dealer and region.

The Wizards from the Land of Oz Have Done It Again!



IT'S NOT HOW MUCH YOU PAY.



IT'S HOW MUCH YOU GET.

The computer at the top has a 64K memory.

It has the initials I, B, and M. And you pay for those initials.

The Commodore 64™ has a 64K memory.

But you don't pay for the initials, you just pay for the computer. About one third the price of the IBM PCjr.™

The Commodore 64 also has a typewriter-type keyboard with 66 typewriter-type keys. (Not rubber chicklet keys like the IBM PCjr.)

It has high resolution graphics with 320 x 200 pixel resolution, 16 available colors and eight 3-dimensional sprites.

It has 9-octave high fidelity sound.

The Commodore 64 is capable of running thousands of programs for home and office. And if you add a printer or color monitor, disk drive and a modem—all together it just about equals the price of the IBM PCjr all alone. With no peripherals.

So you can buy a computer for a lot of money.

Or buy a lot of computer for the money.

COMMODORE 64

IT'S NOT HOW LITTLE IT COSTS,
IT'S HOW MUCH YOU GET.